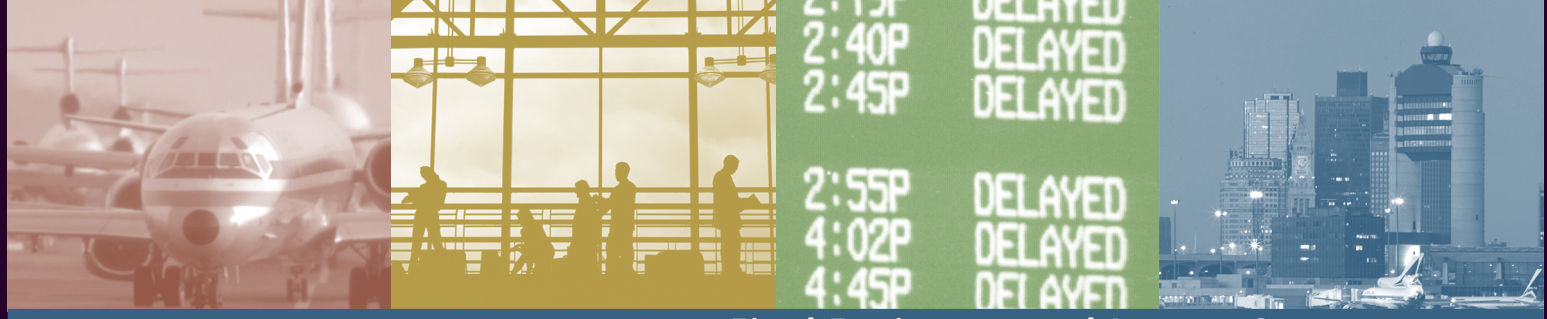

Final Environmental Impact Statement

Logan Airside Improvements Planning Project

Boston Logan International Airport

Federal Aviation Administration

Executive Summary

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June 2002

Executive Summary

Printed on Recycled Paper

Executive Summary

This Final Environmental Impact Statement (Final EIS) has been prepared by the Federal Aviation Administration (FAA) for the Boston Logan International Airport Airside Improvements Planning Project (Airside Project) to satisfy the requirements of the National Environmental Policy Act (NEPA); the Council on Environmental Quality's (CEQ) *Regulations for Implementing the Procedural Requirements of the National Environmental Policy Act of 1969,* as amended, 40 CFR Part 1500; *Policy and Procedures for Considering Environmental Impacts* (FAA Order 1050.1D); and the FAA's *Airport Environmental Handbook* (FAA Order 5050.4A).

The Airside Project evaluated a series of physical and operational improvements to increase airfield efficiency, enhance safety and reduce current and future levels of aircraft and passenger delay at Logan Airport. After careful review of the operational and environmental implications of the various Alternatives, Massport, as airport proprietor, proposed a number of physical improvements to the airfield: construction of a new unidirectional Runway 14/32; construction of a centerfield taxiway; reconfiguration of the southwest corner taxiway system; extension of existing Taxiway Delta; and realignment of existing Taxiway November. In addition, the FAA proposed to reduce aircraft approach minimums on four existing runways (22L, 27, 15R, and 33L). Together, these physical and operational improvements constitute the Proposed Action (Preferred Alternative).[1]

FAA also proposes a wind restriction on the use of Runway 14/32 as a mitigation measure to prevent major changes in runway utilization that would occur with an unrestricted Preferred Alternative. In addition, FAA proposes to conduct an additional study to evaluate potential beneficial operational procedures that would preserve or improve the operational and environmental benefits of the Centerfield Taxiway shown in this EIS. FAA will defer any decision concerning the Centerfield Taxiway until after the study is completed.

The physical changes proposed by Massport must be depicted on an Airport Layout Plan (ALP) submitted to the FAA. FAA's decision evaluates proposed changes to an ALP with respect to safety, efficiency, utility, and environmental impact. The decision to approve an ALP is a federal action subject to NEPA. Subsequent decisions to fund airport improvements shown on an approved ALP are also federal actions subject to NEPA. Finally, FAA's proposal to reduce instrument approach minimums is likewise subject to NEPA.

1 Inherent in these improvements is the establishment or modification of air traffic control procedures and attendant airport navigational aids.

FAA's role with respect to individual elements of the Airside Project, other than the reduced approach minimums, is to review and, if appropriate, approve the federal actions needed to support what Massport, as proprietor of the airport, proposes. In the case of the reduced approach minimums, FAA is the proponent since this action involves use of the navigable airspace, which lies within the exclusive jurisdiction of the FAA.

ES.1 History of Project Environmental Review Process

The state and federal environmental review processes for the Airside Project began in Summer 1995. Following public review and comment processes, the Massachusetts Secretary of Environmental Affairs issued a Certificate in November 1995, which defined the scope for the Draft Environmental Impact Report (Draft EIR), and the FAA issued the scope for the Draft Environmental Impact Statement (Draft EIS) in January 1996.

The combined Draft EIS/EIR for the Airside Project was submitted to state and federal review agencies in February 1999. In accordance with federal and state scoping directives, the Draft EIS/EIR identified and reviewed the operational and environmental implications of various Project Alternatives for increasing airfield efficiency, enhancing safety and reducing current and future levels of aircraft and passenger delay at Logan. A 60-day public comment period on the Draft EIS/EIR ended in late April 1999. This public comment period included two public hearings held on April 7, 1999 at the State Transportation Building in Boston and on April 8, 1999 at the Holiday Inn in East Boston.

In addition to the public hearings, an extensive public participation and review process was conducted throughout the preparation period for the Draft EIS/EIR. In an effort to conduct the analysis with awareness of and input from all concerned parties, the Massport Board, in November of 1995, established the Airside Review Committee (ARC) consisting of the Community Advisory Committee (CAC), which includes representatives from 24 communities surrounding Logan, and 11 business and industry organizations.[2] The Massport Board funded independent consultants for the CAC to provide the Committee with the capacity to professionally assess the analysis and conclusions of the Airside Project study team. Massport, in conjunction with the FAA, held 16 meetings with the ARC between 1995 and 1999; 15 additional meetings with the CAC; and multiple meetings with the CAC's technical consultants during the preparation period for the Draft EIS/EIR. Massport also made 29 presentations to elected officials and held 45 meetings with community and business leaders, reaching an audience of more than 3,000 people. Approximately 500 comment letters were received on the Draft EIS/EIR.

2 Community representatives were appointed by Mayors and Boards of Selectmen from the following communities: Boston, Braintree, Brookline, Cambridge, Charlestown, Chelsea, Dorchester, East Boston, Everett, Hingham, Hull, Jamaica Plain, Melrose, Milton, Quincy, Revere, Roslindale/Hyde Park, Roxbury, Somerville, South Boston, Swampscott, West Roxbury, Weymouth and Winthrop. In addition, the following business and industry organizations were members of the ARC: American Society of Travel Agents - New England, Air Line Pilots Association, Air Transport Association, Aircraft Owners and Pilots Association, Business Express, Cape Cod Economic Development Council, Greater Boston Chamber of Commerce, Greater Boston Convention and Visitors Bureau, Massachusetts High Technology Council, New England Council and the Regional Airline Association.

On May 7, 1999 the Massachusetts Secretary of the Executive Office of Environmental Affairs (EOEA) issued the Certificate on the Draft EIR for the Airside Project. In his Certificate, the Secretary determined that the Draft EIR had adequately and properly complied with the Massachusetts Environmental Policy Act (MEPA) and its implementing regulations. The Secretary also found that the Draft EIR presented sufficient information on alternatives, impacts and mitigation to meet the MEPA standard, and that the Project should proceed to the stage of a Final EIR. The Secretary directed that the Final EIR address certain important issues and respond to the substantive comments received.

In January 2000, after reviewing the Draft EIS, the FAA decided to prepare a Supplemental Draft EIS to address a series of specific issues. At the FAA's direction, a Supplemental Draft EIS Panel (SDEIS Panel) was formed consisting of three members appointed by the Governor of the Commonwealth of Massachusetts and three members appointed by the Mayor of the City of Boston. Under the direction of the FAA New England Region, the SDEIS Panel convened in March of 2000 and met 12 times, concluding with a final meeting in December of 2000. In addition to these formal meetings, the SDEIS Panel made visits to Hanscom Field, Worcester Regional Airport, T.F. Green/Providence Airport, Manchester Airport, and the Logan Air Traffic Control Tower (ATCT). To provide the SDEIS Panel with appropriate background, the Panel was presented with: (a) an Interim Supplemental Draft EIS to the Airside Project Draft EIS/EIR; (b) answers to key letters from members of the public, concerned agencies and public officials responding to the Airside Project Draft EIS/EIR; and (c) a series of 15 visual and written presentations from the Airside Project's technical consulting team and other transportation industry experts.

A Supplemental Draft Environmental Impact Statement/Final Environmental Impact Report (Supplemental DEIS/FEIR) was prepared in response to a special set of work tasks developed by the FAA during the SDEIS Panel review process and to the EOEA Secretary's scope for the Final EIR. The Supplemental DEIS/FEIR was filed in March, 2001, in accordance with NEPA and MEPA. Notice of availability of the Final EIR was published in the *Environmental Monitor* on March 24, 2001 and Notice of Availability of the Supplemental Draft EIS was published in the *Federal Register* on March 23, 2001.

The Supplemental DEIS/FEIR was the subject of a 75-day (extended from 45 days) public comment period and two public hearings held at 3:00 PM and 6:00 PM April 25, 2001 at the Radisson Hotel in Boston. Approximately 800 people attended the public hearing and Spanish-speaking translators were made available. Approximately 850 comment letters were received during the Supplemental DEIS/FEIR comment periods. These comments have been reviewed and are responded to in Volumes 2-6 of this Final EIS. On June 15, 2001, the Secretary of the EOEA issued a Certificate determining that the Final EIR adequately and properly complies with MEPA and its implementing regulations, thus concluding the state environmental review of the Airside Project.

This Final EIS responds to the comments and issues raised during the public review of the Supplemental DEIS/FEIR. This Final EIS summarizes the descriptions of the Affected

Environment and Environmental Consequences provided in the Draft EIS/EIR and the Supplemental DEIS/FEIR. This Final EIS also provides updated analyses, where appropriate, and in that sense it augments the Draft EIS/EIR and the Supplemental DEIS/FEIR and is intended to be reviewed in conjunction with those documents.[3]

ES.2 Key Findings of the Logan Airside Improvements Planning Project EIS Documents

ES.2.1 Purpose and Need

- Logan plays a critical role in the New England economy, serving as the region's long-haul and international gateway while providing a comprehensive range of air services for the immediate Greater Boston market area. Logan generates $1.4 billion in economic impact annually and induces the generation of an additional $3.6 billion in the regional economy.
- Logan is consistently ranked as one of the nation's most delayed airports.[4] In 2000, Logan was the 6th most delayed airport overall and the 2nd worst U.S. airport based on arrival delays.
- Logan generally operates on three active runways with a capacity of approximately 120 operations per hour during good weather conditions. Significant delays occur when wind or weather conditions force the airport to operate with fewer than three active runways, or when poor weather requires increased separation distances between aircraft. The reliability of the airport could be significantly improved by constructing Runway 14/32, which would provide a third available runway in the northwest/southeast operating direction.
- In 1998, airlines and passengers experienced approximately 142,000 hours of delay caused by circumstances at Logan—120,000 annual hours of runway delay and an additional 22,000 hours on the taxiways.

ES.2.2 Regional Options

- FAA and Massport are active proponents of an enhanced regional transportation system. Two of the region's alternative airports, T.F. Green/Providence and Manchester, have experienced exceptional growth since 1996. By attracting new airline services, these airports have recaptured passengers from their own service areas and have attracted passengers from the periphery of Logan Airport's core service area. *Since 1996, eight out of ten new air passengers (i.e., the growth between 1996*

3 Copies of the *Logan Airside Improvements Planning Project Draft EIS/EIR* and *Supplemental DEIS/FEIR* can be obtained by contacting John Silva at the FAA, 12 New England Executive Park, Burlington, MA 01803; (781) 238-7602.

4 While the events of September 11, 2001 have resulted in a decrease in passenger demand and operations and therefore have diminished certain delay conditions, FAA believes that the situation is temporary and that passenger demand and operations will recover in the near future.

and 2000) in New England used regional airports rather than Logan, reversing the historic pattern of eight out of ten new air passengers using Logan.

- Effective regional transportation options, including Amtrak's high-speed Acela Express service to New York and greater utilization of outlying airports, have slowed the rate of passenger growth at Logan. To reflect this, the long-term Airside forecast of 37.5 million annual air passengers was extended from 2010 to 2015, consistent with the FAA's FY 2000 to FY 2015 Terminal Area forecast for Logan.
- Even though regional options have slowed Logan's passenger growth, Logan is still the primary airport for a large segment of the region's air passengers that is highly concentrated within the Interstate 495 (I-495) region. Development of regional airports and rail will help to ensure a more balanced and efficient inter-city travel network, but only the Preferred Alternative will alleviate northwest wind and taxiway delays at Logan, which will continue to serve the majority of the region's air passengers.

ES.2.3 Future Analysis Conditions

- The Draft EIS/EIR evaluates the proposed improvements under five different future passenger/aircraft fleet scenarios (29M Low, 29M High, 37.5M Low, 37.5M High, and 45M High) and one historic fleet (1993). The Supplemental DEIS/FEIR evaluates a sixth future fleet, the 37.5M High Regional Jet (RJ) fleet, and another historic fleet, 1998. The Final EIS evaluates a seventh future fleet, the 29M RJ fleet.
- The 29M RJ and the 37.5M High RJ fleets are characterized by a substantial volume of regional jet (RJ) aircraft and a reduced number of non-jet operations compared to current conditions and the fleets analyzed in the Draft EIS/EIR. These new RJ fleets were analyzed to address questions about the utility of Runway 14/32 under conditions of high regional jet growth. Regional jet utilization assumptions for Runway 14/32 were determined by the FAA through an independent analysis performed in the Supplemental DEIS/FEIR and were further confirmed by another assessment in this Final EIS.

ES.2.4 Operational Results

- Runway 14/32 would reduce Logan delay by preventing the decline in runway capacity that currently occurs during northwest wind conditions. If Runway 14/32 had been available in 1998, annual Logan runway delays would have been reduced by 32 percent, and Visual Flight Rules (VFR)[5] delays occurring during northwest winds would have been reduced by 87 percent.

5 VFR - Visual Flight Rules - Rules covering operation and navigation primarily by visual reference to the horizon (for air traffic control) and see-and-avoid procedures (for traffic separation). Visual Flight Rules apply under visual meteorological conditions (i.e. good weather conditions when the ceiling is greater than or equal to 1,000 feet and visibility is greater than or equal to 3 miles).

- Under the 29 million and 37.5 million passenger fleet scenarios analyzed in the Draft EIS/EIR, the proposed improvements would reduce Logan runway delays by 21 to 28 percent.
- Under the 29M RJ and 37.5M High RJ fleet scenarios, the delay modeling indicates that Runway 14/32 would reduce Logan runway delays by 27 to 29 percent, respectively. If demand management measures were in place for the long-term 37.5M RJ scenario, Runway 14/32 would still produce an additional delay reduction benefit of 28 percent.
- Proposed taxiway improvements, particularly the Centerfield Taxiway, will eliminate 26 to 47 percent of projected ground delays under the long-term fleet assumptions and enhance safety by eliminating constraints and bottlenecks in the existing taxiway system.
- The delay reduction benefits of the Preferred Alternative would have been realized at historic activity levels and do not depend on future growth. However, as airport activity levels grow over time, delay reduction benefits also increase. For example, the Preferred Alternative reduces runway delays by 54,000 hours under the near-term 29M RJ Fleet and by 109,000 hours under the long-term 37.5M High RJ Fleet. Assuming demand management measures were in place for the long-term RJ scenario, the Preferred Alternative would still contribute an incremental delay reduction benefit of 85,000 hours.

ES.2.5 Environmental Results

- The Preferred Alternative will reduce delays without causing significant negative environmental impacts. Unidirectional Runway 14/32 will result in environmental benefits by increasing the use of over-water routings. If Runway 14/32 had been available in 1998, nearly 50,000 jet aircraft operations could have been shifted from flight tracks that overfly communities to over-water routings.
- Under all future fleet scenarios, the Preferred Alternative will reduce the number of people residing within the highest noise exposure areas, i.e., the 70 and 75 dB average day-night sound level (DNL) contours. In the Airside Project mitigation plan, the FAA and Massport will provide sound insulation for all residences within the 65 dB DNL noise contour for the 29M Low Scenario.
- Additional analysis using newly released Census 2000 data supports the conclusions of the Supplemental DEIS/FEIR relating to Environmental Justice. Although the minority population of the communities around Logan Airport has increased since 1990, significant adverse noise impacts of the Preferred Alternative are not predominately borne by a minority population. Within the 29M Low 65 dB DNL contour for the Preferred Alternative, only 34 percent of the population is minority, compared to 48 percent in the surrounding communities of Boston, Chelsea, Revere and Winthrop.

ES.2.6 Runway 14/32 Wind Restriction

- In addition to addressing delays that occur during northwest winds, Runway 14/32 provides an opportunity to redistribute flights at Logan Airport, including increasing the use of over-water flight paths and reducing dependence on the heavily utilized north/south runway configurations. However, this redistribution would also increase flight traffic departing off Runways 33L and 27, affecting communities such as East Boston, Chelsea, Everett and South Boston. While this potential shifting of runway utilization would improve compliance with the existing Preferential Runway Advisory (PRAS)[6] goals, Massport has committed in its Section 61 Findings to reassess the PRAS program.

- Given that PRAS will be reassessed, the FAA is proposing to restrict Runway 14/32 for use only during northwest or southeast winds of 10 knots or greater. Any recommendation concerning a wind restriction that might result from the updated PRAS would be subject to appropriate environmental review. This restriction would prevent substantial changes in runway utilization while preserving the principal delay reduction benefits associated with the runway.
  - With a 10-knot northwest/southeast wind restriction, Runway 27's share of jet departures would be approximately 15 percent under the 37.5M High RJ Fleet, the same share as in 2000. Similarly, use of Runway 33L for jet departures would be approximately 6 percent with a 10-knot restriction, the same share achieved in 2000.
  - With a 10-knot northwest/southeast wind restriction, the Preferred Alternative would reduce annual delays at Logan by 89,000 hours, or 24 percent, relative to the No Action for the 37.5M High RJ scenario. This compares to 109,000 hours, or a 29 percent reduction, for an unrestricted Runway 14/32. Thus, the northwest/southeast wind restriction would preserve most of the delay reduction benefits of the unrestricted Runway 14/32.

ES. 2.7 Additional Study of Taxiway Mitigation Measures

- Although the EIS analysis shows that changes in ground noise and air pollution concentrations that would result from the proposed taxiway improvements are very small, and sometimes beneficial, there have been numerous public comments expressing concern over Centerfield Taxiway operations.
- To address community concerns, the FAA is proposing to conduct an additional study to evaluate potential beneficial operational procedures that would preserve or improve the operational and other environmental benefits of the Centerfield Taxiway. This study would be coordinated with representatives from the

6 Logan's Preferential Runway Advisory System (PRAS) is a set of targets for FAA runway assignments that were established by Massport, the FAA, and community representatives in 1983. The objectives of PRAS are to reduce noise exposure for highly impacted communities (i.e., those within the 70 and 75 dB DNL contours) by distributing noise impacts in accordance with the runway use goals, to provide short-term relief from continuous aircraft operations over neighboring communities, and to maximize use of over-water aircraft routings.

communities closest to the ends of Runways 22L and 22R and adjacent to the northern end of the airfield.

- The FAA will defer any decision concerning the Centerfield Taxiway until after the taxiway study is completed.

ES.3 Project Purpose and Need

The proposed unidirectional Runway 14/32 is designed to increase the reliability of Logan by preventing the decline in capacity that occurs during northwest winds. By allowing Logan to maintain its normal operating capacity during these conditions, Runway 14/32 would substantially reduce preventable northwest wind delays.

In addition to improvements that are designed to relieve runway delays, Massport and the FAA examined potential improvements to Logan's complex taxiway system. The proposed taxiway improvements would increase airfield efficiency and decrease taxiway delays by simplifying the existing taxiway system. The taxiway improvements would also enhance safety by reducing the risk of runway incursions.[7]

By every available measure, Logan has a serious delay problem. In 1998, Logan experienced approximately 142,000 annual hours of delay (120,000 hours runway delay and 22,000 hours taxiway delay). In 2000, Logan was the 6th most delayed airport in the U.S. based on FAA OPSNET[8] statistics, yet it ranked 12th in terms of total aircraft operations. FAA data indicate that Logan's record for arrivals is even worse, ranking as the 2nd most arrival-delayed airport in the nation.

Delays at Logan produce substantial costs to airlines, passengers and residents of communities that surround the airport. Airlines experience additional operating costs; passengers miss connecting flights and lose personal or work-related time; and communities experience increased environmental impacts as aircraft queue on taxiways or stack for approach to Logan. In 1998, runway-related delays at Logan are estimated to have cost airlines and consumers more than $300 million.

Airfield congestion and delays at Logan are already unacceptable; they will become even worse if nothing is done. Growth in the Boston and regional economies and populations will continue to stimulate increasing demand for air transportation services at Logan, whether or not the Airside Project is implemented. Logan's existing delay problem will only worsen as future levels of aircraft operations grow. Delays at Logan impact not only passengers traveling to and from Boston, but also propagate through airline route networks, creating delays that are incurred by passengers and airlines in other parts of the national air transportation system.

7 In the context of taxiing aircraft, a runway incursion typically occurs when safe separation standards are violated by a taxiing aircraft that moves onto or across an active runway at a time when an arriving or departing aircraft is intending to use that runway.

8 FAA Air Traffic Operations Network (OPSNET). OPSNET is the official FAA delay reporting system for air traffic management purposes and was formerly known as the Air Traffic Operations Management System (ATOMS). OPSNET counts only the number of flights that suffer a delay of more than fifteen minutes at a single element of the air traffic control (ATC) system (a sector or airport).

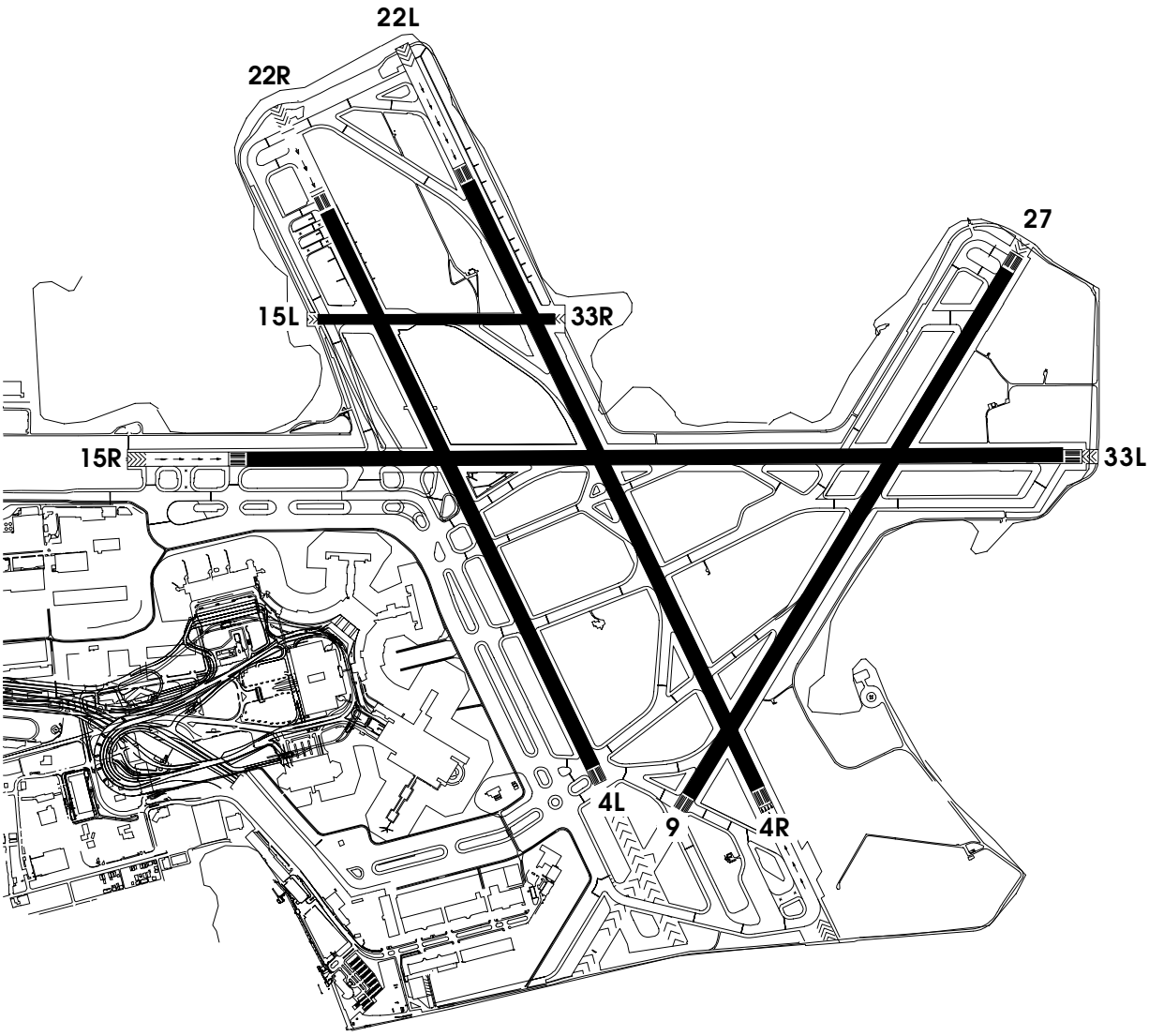
ES.3.1 Logan's Airfield Layout and the Causes of Delays

There are multiple causes of aircraft delays at Logan and nationwide. Solving such a complex problem requires a multifaceted solution and there is no single measure that will resolve all aircraft delays at Logan. Each cause of delay requires a unique solution and no single solution diminishes the need for other effective measures.

Logan's airfield layout, illustrated in Figure ES-1, consists of five runways, which are used in combinations called runway configurations. The availability of specific runway configurations is determined by prevailing wind and weather conditions. Under normal weather conditions, Logan operates on three-runway configurations that can accommodate approximately 120 operations per hour. These configurations are available nearly 80 percent of the year.

Delays occur when wind or weather conditions require FAA ATC to utilize configurations with fewer than three runways, or when poor weather requires increased separation distances between aircraft. Both circumstances produce a significant decline in Logan's airfield capacity. In Boston, ground fog, wind from the northwest, or other strong winds can quickly reduce Logan to one or two active runways, causing delays to compound rapidly. With two runways, Logan's operational capacity declines to 90 or fewer flights per hour; with one runway, which occurs in severe weather or strong northwest wind conditions, Logan's airfield capacity drops to 60 or fewer operations per hour.

Further, the lack of a third available runway in the east-west operating direction causes an imbalance in the geographic distribution of jet operations at Logan. Approximately three-quarters of Logan's jet flights overfly communities impacted by use of north and south runway configurations. Under high demand scenarios, if no corrective actions are taken, Logan's reliance on north/south runway configurations could increase to over 90 percent. The proposed new unidirectional runway (Runway 14/32) would provide an opportunity to reduce reliance on the north/south runway configurations and increase activity over the water compared to future scenarios without Runway 14/32.



RUNWAY LENGTH DATA (feet)

Runway	Landing Length	Take off Length	Displaced Treshold
15R	9,201	10,081	880
33L	10,081	10,081	_
4R	8,850	10,005	1,155
22L	8,806	10,005	1,199
4L	7,860	7,860	_
22R	7,045	7,860	815
9	7,000	7,000	_
27	7,000	7,000	_
15L	2,557	2,557	_
33R	2,557	2,557	_

Figure ES-1

Existing Logan Airport Runway Layout

ES.4 The Role of Regional Transportation Options

For more than a decade transportation planning studies have recommended a regional transportation strategy for New England that includes: an expanded role for the regional airports that surround Logan, high-speed inter-city rail, and airside improvements at Logan Airport. Substantial capital investments, marketing initiatives, and the attraction of new air services have increased passenger acceptance and use of regional airport alternatives to Logan Airport. In addition, Amtrak's Acela service now provides Boston-New York passengers with high-speed rail service. These accomplishments are already diverting a considerable volume of air passenger traffic from Logan by reducing the region's reliance on Logan for high-speed, inter-city travel.

Service expansion at T.F. Green/ Providence Airport to the south and Manchester Airport to the north, two of New England's regional airports, has created viable air travel options in New England. By attracting a substantial level of airline services to short- and medium-haul[9] markets, these airports are not only recapturing passengers generated within their own market areas, but are also absorbing demand from the periphery of Logan Airport's core service area. As a result, since 1996 eight out of ten new air passengers (the growth between 1996 and 2000) in New England used the regional airports rather than Logan.

Since 1995, Massport has been working with the City of Worcester to market Worcester Regional Airport to air carriers. In January 2000, Massport assumed operating responsibility for this airport and is committed to developing a critical mass of air services there. Massport has already been successful in attracting several new services to Worcester, including Delta Connection services to Atlanta and American Eagle services to Chicago. These types of services and continued air service development at Worcester will enable this regional airport to attract a meaningful share of the Logan Airport passengers that originate from central Massachusetts and the Metro West suburbs of Boston.

Massport is also committed to maintaining the utility of Hanscom Field within the regional transportation system. Hanscom will continue to serve primarily as a general aviation reliever for Logan Airport, with a niche role for regional carrier commercial services.

To further the role of regional airports, the FAA, Massport, the Massachusetts Aeronautics Commission (MAC), the other five New England states, the Manchester Airport, and the Rhode Island Airport Corporation (RIAC) are conducting the *New England Regional Airport System Plan Update*, a follow-on to the 1995 *New England Regional Airports Air Service Study*. The study will forecast long-term passenger and cargo demand for the entire region, identify operational capacity and environmental constraints to

9 Short-haul services are less than 750 miles, medium-haul services are 750 to 1,499 miles, and long-haul services are greater than 1,500 miles.

growth, and formulate strategies for maximizing regional airport use and creating a balanced and efficient regional airport network. A copy of the scope of the study is included in Appendix C.

Even with implementation of these aggressive and highly successful regional initiatives, every major regional transportation study has recognized that airside improvements at Logan are critical to the success of the regional transportation system in New England. Logan will continue to function as the region's primary airport, accommodating the core Metropolitan Boston demand, as well as the New England region's demand for international and domestic long-haul travel. The Preferred Alternative would reduce delays when weather conditions, particularly northwest winds, lower Logan's capacity below its typical capability of about 120 hourly operations. While regional airports and rail are essential elements of a balanced and efficient inter-city travel network, they cannot relieve Logan delays that result from northwest winds or inefficiencies in the airport's runway and taxiway layout.

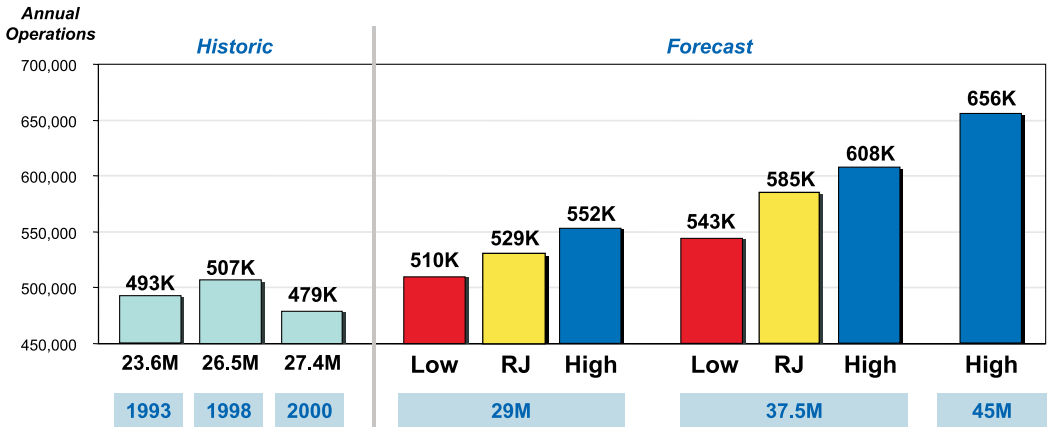
ES.5 Passenger and Operations Forecasts

The Airside Project analysis is based upon a series of historic and alternative near- and long-term fleet scenarios for Logan Airport. The Airside Project Draft EIS/EIR presents analysis of historic 1993 conditions as well as a range of alternative future fleets. The Supplemental DEIS/FEIR, in Section 4.2, provides an updated historic context by analyzing more recent 1998 conditions and includes an additional long-term forecast scenario to reflect increases in regional jet activity. This Final EIS provides analysis of a new near-term fleet scenario that similarly reflects the recent expansion of RJs in the fleet.

While development of regional transportation options has slowed Logan passenger growth, Logan handled 27.4 million annual passengers in 2000. If the airport remains on its historical growth path, annual passenger demand is expected to reach 29 million passengers by 2004 and 37.5 million passengers in 2015. These passenger levels represent the near-term and long-term forecast demand against which the proposed airside improvements were evaluated. In addition, a higher demand level of 45 million annual passengers was also evaluated in the Draft EIS/EIR.

The operational benefits and environmental impacts of the Preferred Alternative have been measured based on the levels of aircraft activity associated with the various near- and long-term passenger projections. For individual fleet scenarios, these impacts relate to the level and mix of activity, and not the specific year in which they may be realized.

Figure ES-2
Logan Airside Passenger and Fleet Forecasts



As shown in Figure ES-2, Logan's forecast aircraft operations range from 510,000 for the near-term 29 million passenger (29M) Low Fleet scenario to 656,000 for the long-term 45M High Fleet scenario. The High and Low scenarios for aircraft operations at each passenger level reflect different assumptions regarding the aircraft fleet mix at Logan. The Low Fleet scenarios assume more large jet aircraft operations and fewer non-jet operations, similar to recent conditions, while the High Fleet scenarios assume a greater proportion of non-jet aircraft and thus a higher level of total operations. Recent trends at Logan and across the nation indicate a rapidly increasing presence of RJ aircraft. To examine the potential impacts that these 30- to 70-seat jet aircraft may have on the Airside Project's operational and environmental findings, additional near- and long-term fleet scenarios were developed. These fleets—the 29M RJ and 37.5M High RJ Fleets—reflect growth in RJ aircraft operations and a concurrent decline in non-jet operations.

These fleet scenarios represent unconstrained forecasts of aircraft activity. For certain long-term, High Fleet scenarios, delay levels are substantial due to the high number of total operations and serious overscheduling during peak periods. Under these scenarios, intervening demand management initiatives may be implemented to limit overscheduling during peak periods and reduce the resulting levels of delays. Figure ES-3 shows that demand management reduces the projected level of total operations under scenarios with high demand. These activity reductions have been incorporated in the Alternatives that include Peak Period Pricing.

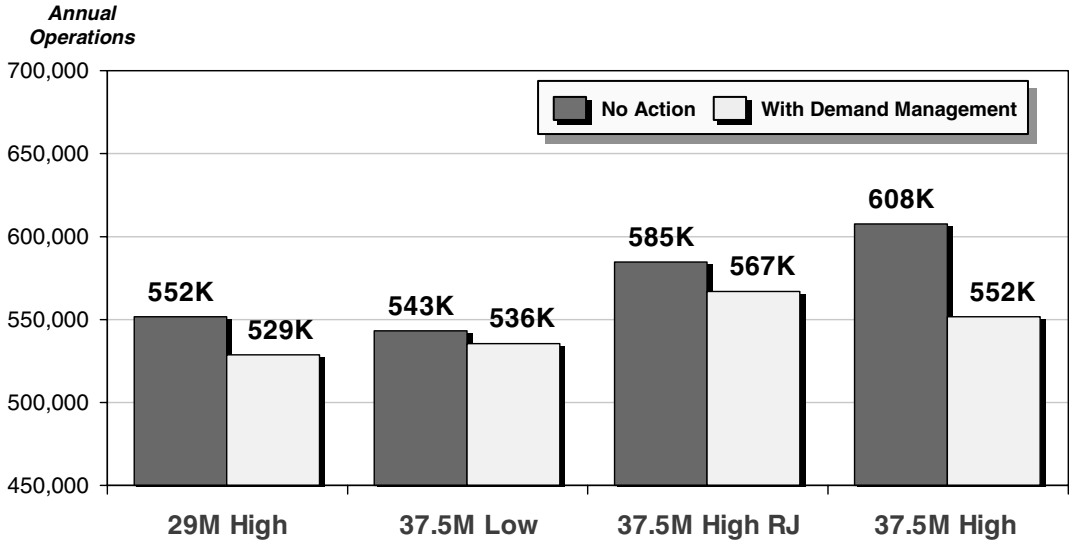
While demand management would reduce both operations and flight delays, the unconstrained High Fleet scenarios were considered in the EIS analysis for the following reasons:

- The delay reduction and environmental impacts of peak period pricing, a form of demand management that was separately considered in the Airside Project EIS,

can only be identified through comparison to an unconstrained No Action Alternative.[10]

- The long-term High fleet forecasts represent a realistic outer range of unconstrained activity and provide a conservative upper bound for environmental impacts under the No Action Alternative.
- The long-term High scenarios reflect a degree of overscheduling that has historically occurred at Logan. In 1993, when Logan was served by three regional carrier systems, hourly flight activity exceeded 120 operations per hour for three hours during peak summer periods (August weekdays). Recent growth in regional jets and the continued presence of multiple regional carrier systems suggest that a return to similar overscheduling conditions represents a reasonable unconstrained forecast scenario. The August weekday demand profile for the 37.5M High RJ fleet shows only four hours with demand greater than 120 hourly operations. The remaining long-term growth in operations is shifted to off-peak hours, consistent with recent Logan trends as described in Section 4.2.2.3 of the Supplemental DEIS/FEIR.

Figure ES-3
High Demand Fleet Forecasts Constrained by Demand Management



10 While peak period pricing was considered as an improvement option in Alternatives 1, 2, and 3, the No Build Alternative, Alternative 3, only includes peak period pricing and the reduced minimums and excludes other build options.

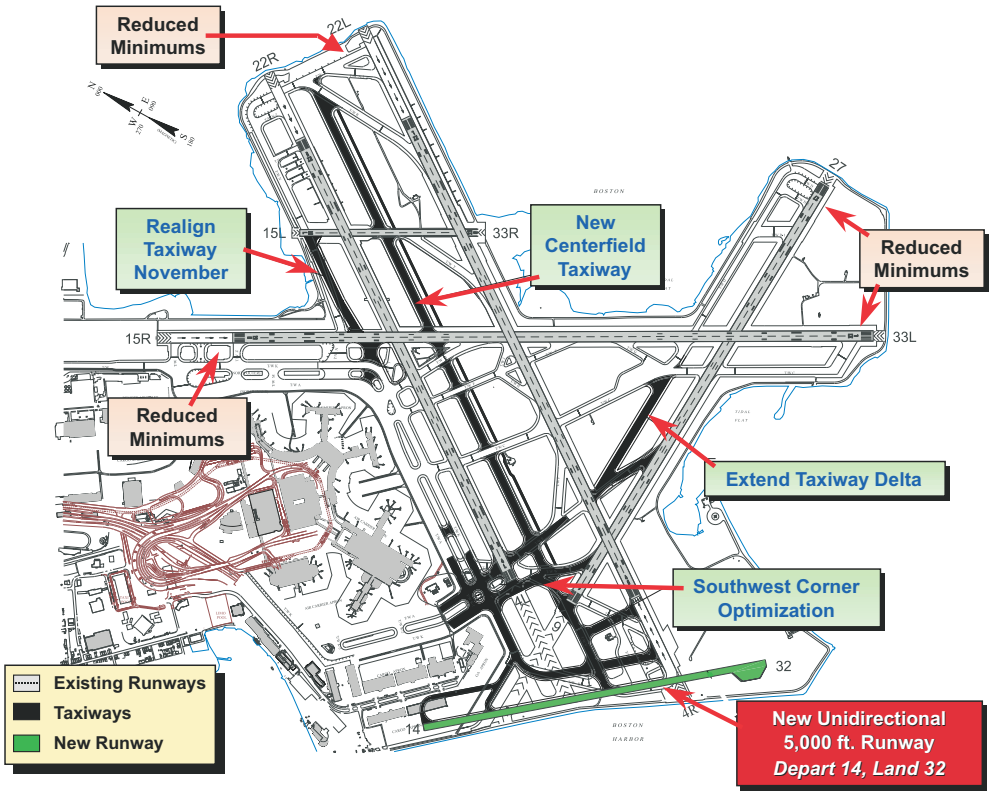
ES.6 Improvement Options and Project Alternatives

ES.6.1 Improvement Options

In the Airside Project Draft EIS/EIR, Supplemental DEIS/FEIR, and this Final EIS, the FAA and Massport studied and evaluated the following improvements, shown in Figure ES-4, to reduce congestion and delays and enhance safety at Logan:

- Construction of unidirectional Runway 14/32;
- Construction of a Centerfield Taxiway;
- Extension of Taxiway Delta;
- Realignment of Taxiway November;
- Optimization of the Southwest Corner taxiway layout;
- Reduction in approach minimums on Runways 22L, 27, 15R, and 33L; and,
- Implementation of Peak Period Pricing.

Figure ES-4
Physical and Operational Improvement Options



ES.6.1.1 Unidirectional Runway 14/32

Construction and operation of a 5,000-foot unidirectional Runway 14/32 is designed to address delays during moderate to high northwest winds by providing a third active runway in conditions that now require Logan to operate on one or two runways. All flights using Runway 14/32 would arrive or depart over Boston Harbor.

With the recent growth in RJ activity and the corresponding decline in turbo-prop operations, the utility of a 5,000 foot runway length has been questioned. However, the FAA conducted an independent review of the runway's probable utilization by RJs and found that the runway length would be acceptable for most RJ operations forecast at Logan. In addition, Logan will continue to have a significant volume of turboprop and piston non-jet aircraft serving smaller destinations across New England. (Appendix D of the Final EIS contains the detailed fleet forecasts.)

ES.6.1.2 Taxiway Improvements

Construction of the 9,300 foot Centerfield Taxiway located between Runways 4L/22R and 4R/22L will reduce taxiway congestion, thereby reducing the possibility of runway incursions and wingtip conflicts, and will enhance the general safety and efficiency of movement on the airfield. By reducing aircraft taxiing time, the Centerfield Taxiway also contributes to small reductions in air pollution and noise generated by ground operations.

The other proposed taxiway improvements (extension of taxiway Delta, the realignment of taxiway November, and the optimization of the taxiway layout in the Southwest Corner of the airfield) are also designed to reduce taxiway congestion by facilitating more efficient movement of aircraft between the terminal areas and the runways, and to enhance safety by reducing the potential for runway incursions.

ES.6.1.3 Reduced Approach Minimums

Approach minimums[11] for Runways 15R, 22L, 27 and 33L will be reduced to levels consistent with the capabilities of the present navigational equipment. Greater availability of these runways will enhance safety under adverse operating conditions by providing positive instrument guidance at low altitudes. The proposed reduced minimums at Logan would be consistent with recommended standards as established in FAA Order 8260.3B, United States Standards for Terminal Instrument Procedures.

ES.6.1.4 Peak Period Pricing

Peak Period Pricing was evaluated as a demand management mechanism for reducing delay by eliminating flights during periods when scheduled demand exceeds airfield capacity. Peak Period Pricing raises the price of using the airfield during designated peak

11 Approach Minimums define the lowest visibility and cloud ceiling conditions under which an aircraft can conduct an approach. These minimums are established based on a number of criteria including the type of ILS equipment serving the runway, the local terrain, obstacles near and beneath the flight path, and standard aircraft approach speeds.

hours, causing some users to discontinue or reduce peak period operations or shift flights to off-peak hours. While recent Logan flight demand can be accommodated under normal operating conditions, overscheduling conditions have occurred in the past and could re-emerge in the future. In its Section 61 Findings, pursuant to the Massachusetts Environmental Policy Act, Massport committed to implement an enforceable peak period pricing or alternative demand management program with comparable effectiveness. The objective of the program will be to avoid or reduce delays associated with overscheduling of Logan Airport's available capacity in good weather conditions. The goal is to have a demand management program in place before overscheduling conditions emerge. The FAA acknowledges Massport's efforts and anticipates that any demand management proposal will be consistent with applicable federal law. The FAA is currently working with the U.S. Department of Transportation (U.S. DOT) to establish national guidelines for demand management programs at United States airports.

ES.6.2 Project Alternatives

The individual improvements were combined into a series of Alternatives for comparative purposes, as shown in Table ES-1. In the Airside Project EIS Documents, the FAA and Massport analyzed the delay reduction benefits and environmental impacts of each improvement concept (See Table ES-2).

ES.6.3 Benefits of the Preferred Alternative

After careful review of the extent and causes of delays at Logan and the comparative benefits and impacts of each Alternative, Alternative 1A was selected as the Preferred Alternative. Chapter 8 of the Draft EIS/EIR fully describes the basis for selection of the Preferred Alternative. Alternative 1A will significantly reduce delay while achieving certain environmental benefits, including improved air quality and reduced noise exposure for the most severely affected communities. As part of the Project mitigation plan approved during the state environmental review process, Massport has committed to implement Peak Period Pricing or an alternative, but equally effective, demand management technique. FAA plans to participate in and support Massport's efforts and expects that any proposal put forth by Massport would be consistent with the requirements of federal law.

With the availability of unidirectional Runway 14/32 and the other recommended improvements comprising the Preferred Alternative, runway delays at Logan in 1998 could have been reduced by 32 percent, with a 69 percent reduction in VFR delays. Delays during northwest wind conditions would have been reduced by nearly 90 percent.

Table ES-1
Logan Airside Improvements Alternative Packages

Improvement Concept	Alternative 1 All Actions	PREFERRED ALTERNATIVE Alternative 1A All Actions Except Peak Period Pricing*	Alternative 2 All Actions Except Runway 14/32	Alternative 3 No Build	Alternative 4 No Action
Runway 14/32	■	■			
Taxiways:					
Centerfield	■	■	■		
Extend Delta	■	■	■		
Realign November	■	■	■		
Optimize Southwest Corner Taxiway Layout	■	■	■		
Operational:					
Reduced Minimums	■	■	■	■	
Peak Period Pricing	■		■	■	

* Peak Period Pricing, or an alternative demand management program with comparable effectiveness, is part of the mitigation program for the Preferred Alternative.

Table ES-2
Purpose of Airside Improvement Concepts

Improvement Concept	Purpose
Construct Unidirectional Runway 14/32	Reduce Northwest Wind Delays
Peak Period Pricing	Reduce Overscheduling Delays
Construct Centerfield Taxiway	Reduce Taxiway Delays, Enhance Safety
Extend Taxiway Delta	Reduce Taxiway Delays, Enhance Safety
Realign Taxiway November	Simplify Taxiway System, Enhance Safety
Optimize Southwest Corner Taxiways	Reduce Taxiway Delays, Enhance Safety
Reduce Approach Minimums on Runways 22L, 27, 15R and 33L	Enhance Safety and Reliability

The proposed Runway 14/32 would also permit a substantial increase in use of the preferred over-water arrival and departure routes. Under the 29M Low Fleet scenario, approximately 52,000 jet operations, or 17 percent of total jet operations, could shift from flight paths over communities to flight paths over the water. Under the 37.5M High scenario, 89,000 jet operations could shift to flight paths over the water.

Taxiway improvements are projected to reduce ground delays by 47 percent with the 29M Low Fleet and 26 percent with the 37.5M High Fleet by eliminating constraints and inefficiencies in the taxiway system. The proposed new unidirectional runway also helps reduce Logan's taxiway delays. With the Preferred Alternative, which includes unidirectional Runway 14/32, taxiway delays are expected to decline by 65 to 70 percent (Preferred Alternative vs. No Action).

The principal benefit of reducing the approach minimums on Runways 15R, 22L, 27 and 33L is to enhance safety by providing positive instrument guidance at low altitudes below existing minimums, providing the opportunity for aircraft to use runways more aligned with the wind during low visibility conditions, and reducing the probability of missed approaches. By providing increased reliability of the Airport in low visibility conditions, lower approach minimums also result in modest delay reduction benefits. Additionally, with the reduced minimums, in the infrequent event of a missed approach, the principal noise impacts would occur over the Airport rather than over residential areas.

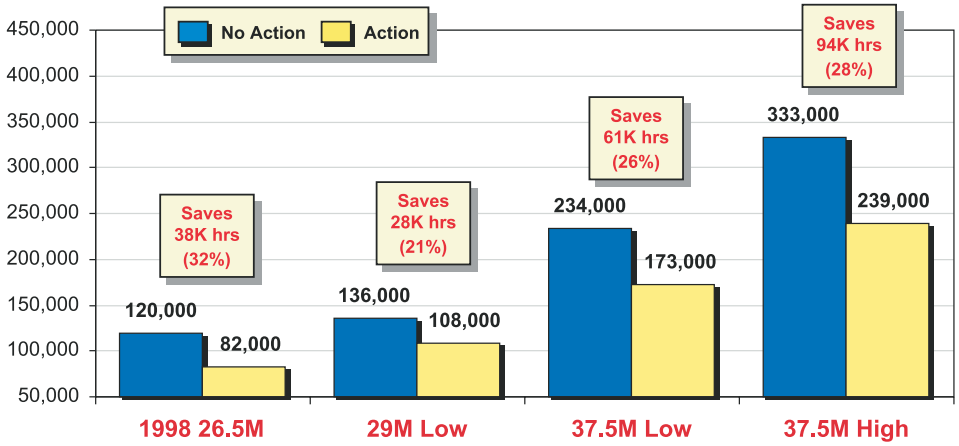
ES.7 Delay Modeling Results

State-of-the-art airfield simulation models were used to quantify the levels of delay at Logan under past, recent, and anticipated future operating conditions. For each forecast scenario, the appropriate baseline analysis is the No Action Alternative (Alternative 4). The operational and environmental benefits and impacts of the Preferred Alternated are evaluated by comparing the results of the Preferred Alternative to the No Action Alternative.

If no action is taken to improve the operating efficiency of the Logan airfield, annual runway-related delays could grow from approximately 120,000 hours in 1998 to as high as 333,000 hours under the long-term 37.5M High Fleet scenario (see Figure ES-5). With no improvements, average delays could rise from 14 minutes to 33 minutes per flight. Alternatively, implementing the Preferred Alternative would have reduced 1998 delays by 32 percent (or 38,000 annual hours). As demand grows in the future, the Preferred Alternative would reduce Logan runway delays by 21 percent (or 28,000 annual hours) in the 29M Low Fleet and by 28 percent (or 94,000 annual hours) in the 37.5M High Fleet, while significantly reducing delays during northwest wind conditions. Even with a 10-knot wind restriction on Runway 14/32, the Preferred Alternative still produces substantial delay reduction benefits (see Section ES.9.8.1).

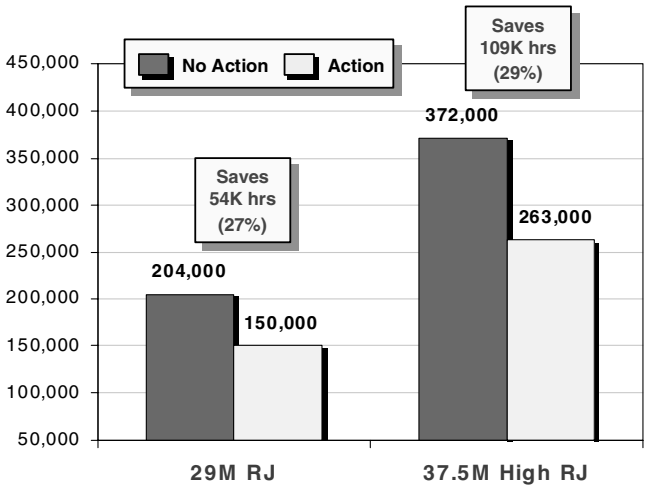
In light of the recent growth in RJ activity, the delay reduction benefits of the Preferred Alternative under a long-term 37.5M High RJ Fleet were analyzed in the Supplemental DEIS/FEIR. The delay modeling performed for this fleet incorporated RJ utilization assumptions for the proposed 5,000 foot runway developed from an independent FAA analysis. Using these conservative assumptions, the Preferred Alternative would reduce annual runway delays by 109,000 hours or 29 percent, compared to the No Action Alternative (see Figure ES-6).

Figure ES-5
Annual Hours of Runway-Related Delay Reduction — Preferred Alternative (Action) vs. No Action for Draft EIS/EIR Fleets



In this Final EIS, an additional fleet—the 29M RJ Fleet—was also assessed to evaluate the impacts of the Preferred Alternative under a near-term fleet with a significant number of regional jet aircraft. Under the 29M RJ Fleet, the Preferred Alternative would reduce projected runway delays by 54,000 annual hours or 27 percent compared to the No Action Alternative (See Figure ES-5). These analyses demonstrate the consistent utility of the proposed runway, even under scenarios with high regional jet activity.

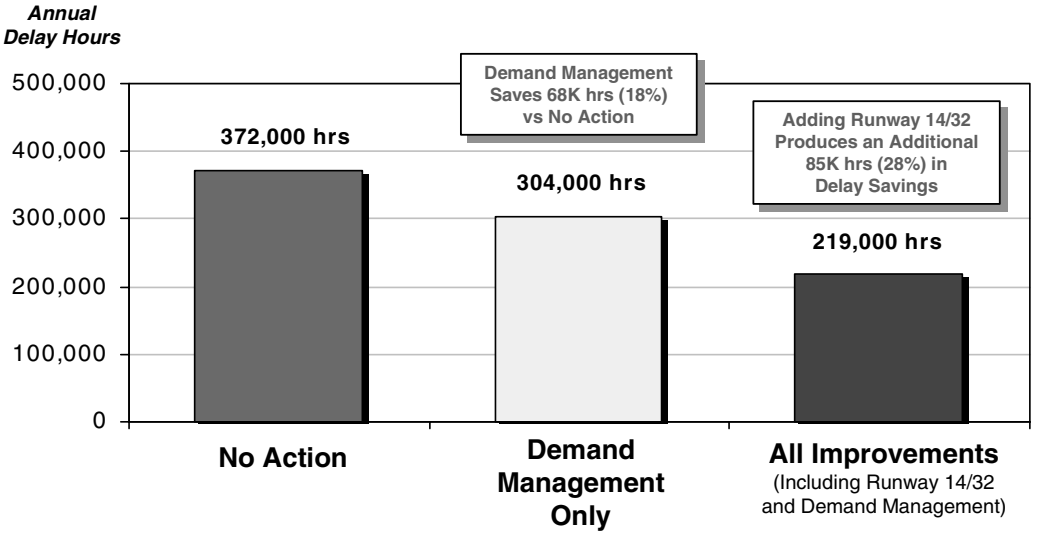
Figure ES-6
Annual Hours of Runway-Related Delay Reduction — Preferred Alternative (Action) vs. No Action for Supplemental DEIS/FEIR and Final EIS Regional Jet Fleets



Demand management will likely be in place under the long-term high demand scenarios. A comparison between the No Build or Demand Management Alternative (Alternative 3) and the All Improvements Alternative (Alternative 1) allows determination of the incremental delay reduction benefits of Runway 14/32 after demand management is in

place. If no action is taken to improve the operating efficiency of the Logan airfield, annual runway-related delays could grow from approximately 120,000 hours in 1998 to a level two to three times higher under the long-term scenarios, absent any actions by airlines, Massport, or the FAA to manage demand. Alternatively, implementing the Preferred Alternative would reduce future Logan runway delays by 21 to 29 percent (or 28,000 to 109,000 hours), significantly reducing delays during northwest wind conditions through the use of Runway 14/32. Assuming that demand management measures were already in place to address high levels of baseline delays, Runway 14/32 would still provide incremental delay reduction benefits of 18 to 28 percent (or 26,000 to 85,000 hours) under the high demand scenarios. This point is illustrated in Figure ES-7, which presents the delay reduction benefits of Runway 14/32 under the 37.5M High RJ scenario. Even with demand management in place, Runway 14/32 reduces delays by an additional 28 percent, or 85,000 hours.

Figure ES-7
Delay Reduction Benefits of Runway 14/32 with Demand Management in Place
37.5M High RJ Fleet



The EIS analysis indicates that demand management would provide significant benefits in the long-term when airline overscheduling exists, but would not be an effective near-term solution to Logan's delay problem. In contrast, Runway 14/32 reduces delays due to northwest winds under historic, current and future scenarios, and its delay reduction benefits are not dependent upon long-term growth in operations. In addition, Runway 14/32 produces significant delay reduction benefits even with demand management in place under those future scenarios where such a program would be justified.

ES.8 Environmental Impacts

While the Airside Project EIS Documents examine a full range of environmental impacts, particular attention has been given to the issues of noise, air quality, and environmental justice. Throughout this Section, the discussion focuses on the environmental impacts of the Preferred Alternative. The environmental consequences associated with a wind restriction on Runway 14/32 are also summarized in this Section and in Sections ES.9.8.3 to ES.9.8. 8. The environmental implications of deferring a decision on the Centerfield Taxiway are presented in Section ES.9.10.

ES.8.1 Noise

Noise impacts depend not only on the number of arriving and departing aircraft associated with a specific fleet forecast, but also on the flight paths that the aircraft follow. Figure ES-8 presents Logan's existing flight tracks, while Figure ES-9 shows the additional flight paths associated with Runway 14/32. Arrivals to Runway 32 come from the harbor over water, while departures from Runway 14 turn to climb out over the water.

While aircraft that use Runway 14/32 would ultimately cross over land, these flight paths are considered over-water because the land crossing occurs farther from the Airport and at higher altitudes than other flight tracks, resulting in minimal noise impacts. The closest populated land area overflown by arrivals to Runway 32 is the tip of the Hull peninsula, approximately five miles from the runway end, and well outside of the 65 dB Day-Night Sound Levels (DNL) noise contour. In contrast, arrivals to Runways 4L/R and 22L/R fly over populated land areas within one-half mile of the runway ends, extending the noise contours into the communities of South Boston, East Boston, Winthrop, and Revere.

Departures from Runway 14 climb initially over water, with commuter aircraft directed by air traffic control and jet aircraft assigned a track similar to the noise abatement departure procedure for Runway 15R. This involves an initial left turn after takeoff to head out the mouth of Boston Harbor before turning north or south to cross back over the shoreline. The large majority of these jet aircraft do not cross back over land until they are at or above 6,000 feet, and thus do not impact the noise contours over populated areas.

For the lowest-altitude portions of flights to and from the proposed runway, aircraft will fly over water. In addition, the flight tracks for Runway 14/32 demonstrate that aircraft using Runway 14/32 will not fly over populated areas that are not currently overflown by aircraft utilizing Logan's existing runways.

By providing this overwater routing, the Preferred Alternative significantly reduces the number of residents in surrounding communities that are exposed to the highest noise emissions, i.e., the 70 dB and 75 dB DNL contours. The communities that benefit from these noise exposure reductions are Winthrop, parts of East Boston, and Revere. As shown in Table ES-3, the Preferred Alternative virtually eliminates the populations in the 75 dB DNL contour under the 29M Low and 37.5M High Fleet scenarios, which have been shown to

bracket the range of likely impacts. In the 29M Low Fleet scenario, the Preferred Alternative results in 120 fewer people in the 75 dB DNL, a 98 percent reduction in exposed population. Similarly, in the 37.5M High Fleet, the Preferred Alternative results in 187 fewer people in the 75 dB DNL, a 100 percent reduction in exposed population.

Implementation of the Preferred Alternative also results in significant population reductions in the 70 dB DNL. In the 29M Low Fleet scenario, there would be 231 fewer people in the 70 dB DNL (a 14 percent reduction) and in the 37.5M High Fleet, there would be approximately 2,765 fewer people exposed to 70 dB DNL and above (a 74 percent reduction).

Table ES-3
Cumulative Noise Exposed Population Summary[1] (Census 2000)[2]

Day-Night Sound Level in dB	No Action Alternative	Preferred Alternative	Preferred Alternative Compared to No Action	Percent Change vs. No Action
29M Low Fleet				
DNL 75 dB and above	122	2	-120	-98%
DNL 70 dB and above	1,612	1,381	-231	-14%
DNL 65 dB and above	18,960	18,562	-398	-2%
DNL 60 dB and above[3]	68,171	71,418	2,909	4%
37.5M High Fleet				
DNL 75 dB and above	187	0	-187	-100%
DNL 70 dB and above	3,733	968	-2,765	-74%
DNL 65 dB and above	12,423	12,676	253	2%
DNL 60 dB and above[3]	47,615	59,737	12,122	25%

1 All estimates are based on runway use chosen to most nearly meet PRAS goals and reflect the effects of delayed aircraft as determined by the DELAYSIM model.
2 Population counts updated from the Draft EIS/EIR and Supplemental DEIS/FEIR to reflect Census 2000 data.
3 The federal FAA standard for noise impact analysis is 65 dB DNL. The 60 dB DNL analysis was included at the request of the EOEA Secretary.

The Preferred Alternative also reduces the population exposed to the 65 dB DNL contour in the short-term 29M Low Fleet. As shown in Table ES-3, there are 398 fewer people in the Preferred Alternative's 65 dB DNL contour. However, the reduction in noise exposure at the highest DNL values, i.e., 70 and 75 dB, is generally achieved by redistributing aircraft onto other runways, which causes increases in exposure at lower DNL values. For example, in the 37.5M High Fleet, the population in the 65 dB DNL increases by 253 people, an increase of 2 percent, over the No Action Alternative.

Figure ES-10 illustrates the 60, 65, and 70 dB DNL contours for the Preferred Alternative and the No Action Alternative under the 29M Low Fleet scenario. Figure ES-11 presents similar contours for the 37.5M High Fleet scenario. The 29M Low Fleet scenario more closely resembles recent activity at the airport and represents the future analysis scenario with the greatest noise impacts (in terms of population within the 65 dB DNL contour).

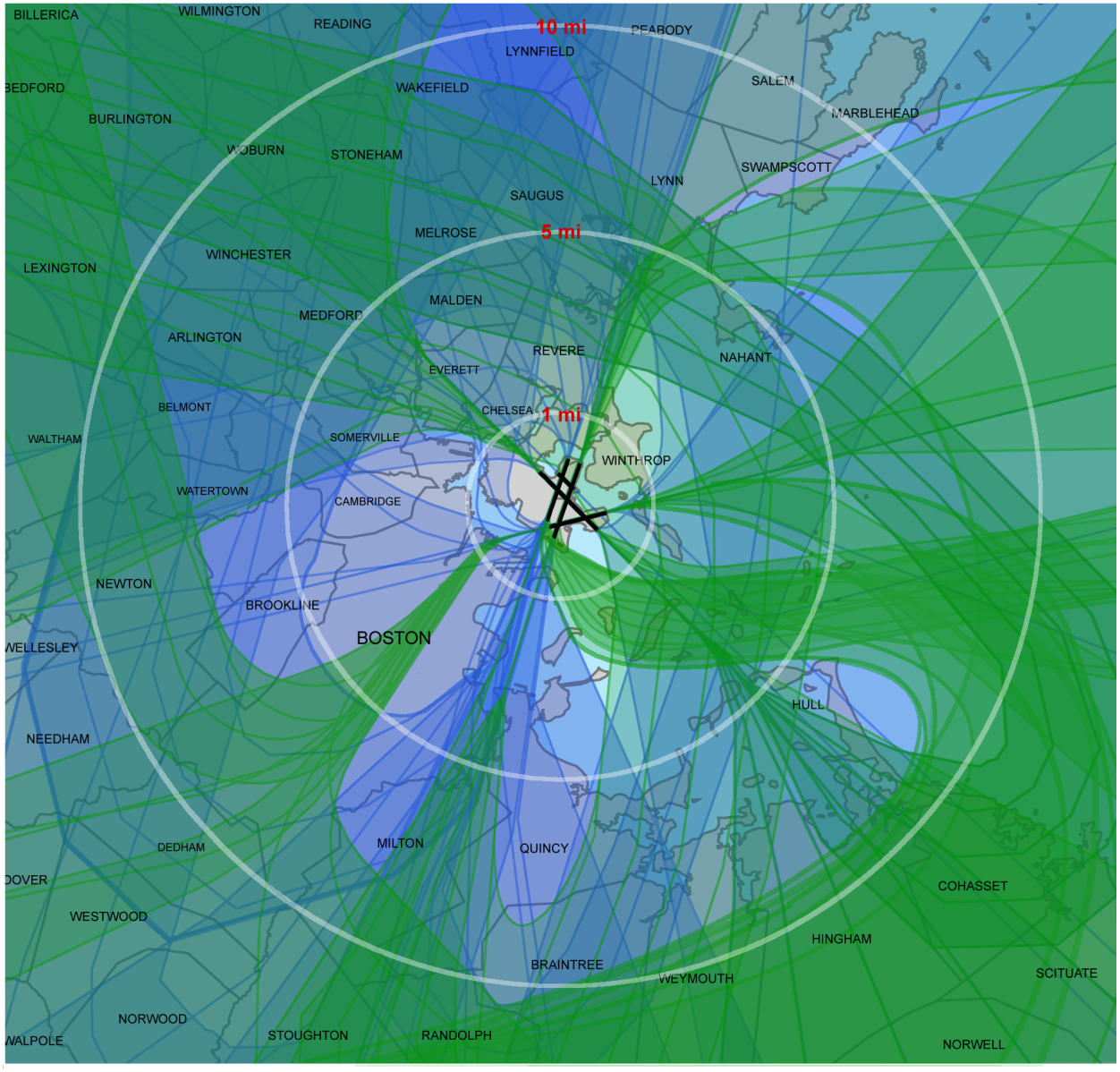
By reducing delays, the Preferred Alternative is estimated to reduce the average number of nighttime operations by approximately 5 percent, compared to the No Action Alternative, under the 29M Low Fleet scenario. The Preferred Alternative is even more effective at reducing delays under the 37.5M High Fleet forecast. In that scenario, the number of nighttime operations is reduced by 20 percent, compared to the No Action Alternative. These reductions occur by preventing flights scheduled during daytime hours from being delayed into the nighttime period.

In the 29M Low Fleet scenario, no one residing in an area exposed to noise above 65 dB DNL is projected to experience an increase greater than 1.5 dB (the FAA threshold for defining significant adverse impacts) as a result of the Preferred Alternative.

Noise impacts from ground taxi operations are significantly lower than noise impacts from aircraft on the runways and in flight. Nevertheless, the Preferred Alternative generally reduces ground noise by lowering DNL levels due to taxiing operations by less than 1 dB to as much as 3 dB at seven close-in monitoring locations.

In comparison to the No Action Alternative, the Preferred Alternative would provide an opportunity to redistribute flight traffic at Logan Airport and better achieve the long- and short-term goals of the Preferential Runway Advisory System (PRAS). The basic objectives of PRAS are to reduce those areas subject to the highest noise exposure levels (e.g., within the 70 and 75 DNL contours); to equitably distribute noise in accordance with annual runway utilization goals; to provide short-term relief from continuous aircraft operations over neighborhoods that are close to Logan; and to maximize the use of over-water aircraft routings. Runway 14/32 would result in greater use of over-water flight paths and would lessen the airport's dependence on the heavily utilized north/south runway configurations, consistent with the PRAS goals. However, this redistribution of flights could also result in increased usage of Runways 27 and 33L for departures, which would impact communities in East Boston, Chelsea, Everett, and South Boston. While this increased usage of Runways 27 and 33L is in agreement with existing PRAS goals, Massport has committed in its Section 61 Findings to begin working with the CAC to update PRAS.

Given that PRAS will be reevaluated, the FAA is proposing as a mitigation measure to restrict Runway 14/32 for use only during northwest or southeast winds of 10 knots or greater. Any recommendation concerning a wind restriction that might result from the updated PRAS would be subject to appropprate environmental review. With a 10-knot wind restriction on Runway 14/32, the Preferred Alternative would reduce the total number of people in the 60, 65, 70, and 75 dB DNL contours for the 29M Low scenario and would not cause significant adverse noise impacts to any communites when compared to the No Action Alternative. See Sections ES.9.8.3 and 9.8.4 for additional discussion of the noise impacts of a restricted Runway 14/32.



Existing Jet Arrivals and Departures in Green **Existing Turboprop Arrivals and Departures in Blue**

Note: Mileage rings are for reference only and do not indicate actual distance along the flight path.

Detailded flight tracks, including altitudes, are presented in Chapter 5 (figures 5.2-1 & 5.2-2) and Chapter 6 (figures 6.2-1, 6.2-2, 6.2-3 & 6.2-4) of the Supplemental DEIS.

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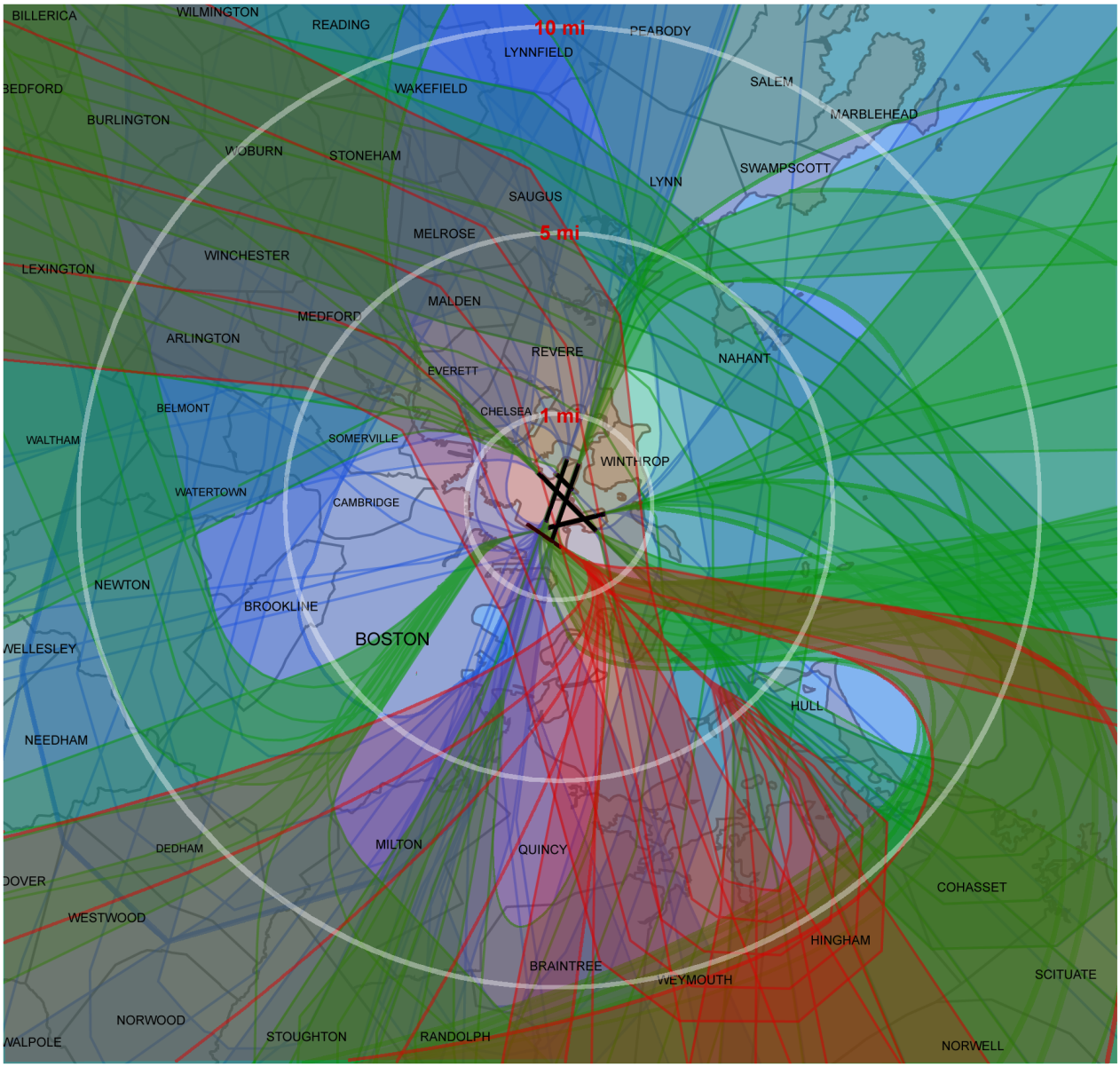
Figure ES-8

Modeled Flight Tracks for Aircraft on All Existing Runways

7676-FIG-ES-6.p65



Existing Jet Arrivals and Departures in Green **Existing Turboprop Arrivals and Departures in Blue**

Runway 14-32 Arrivals and Departures in Red (Jet and Turboprop)

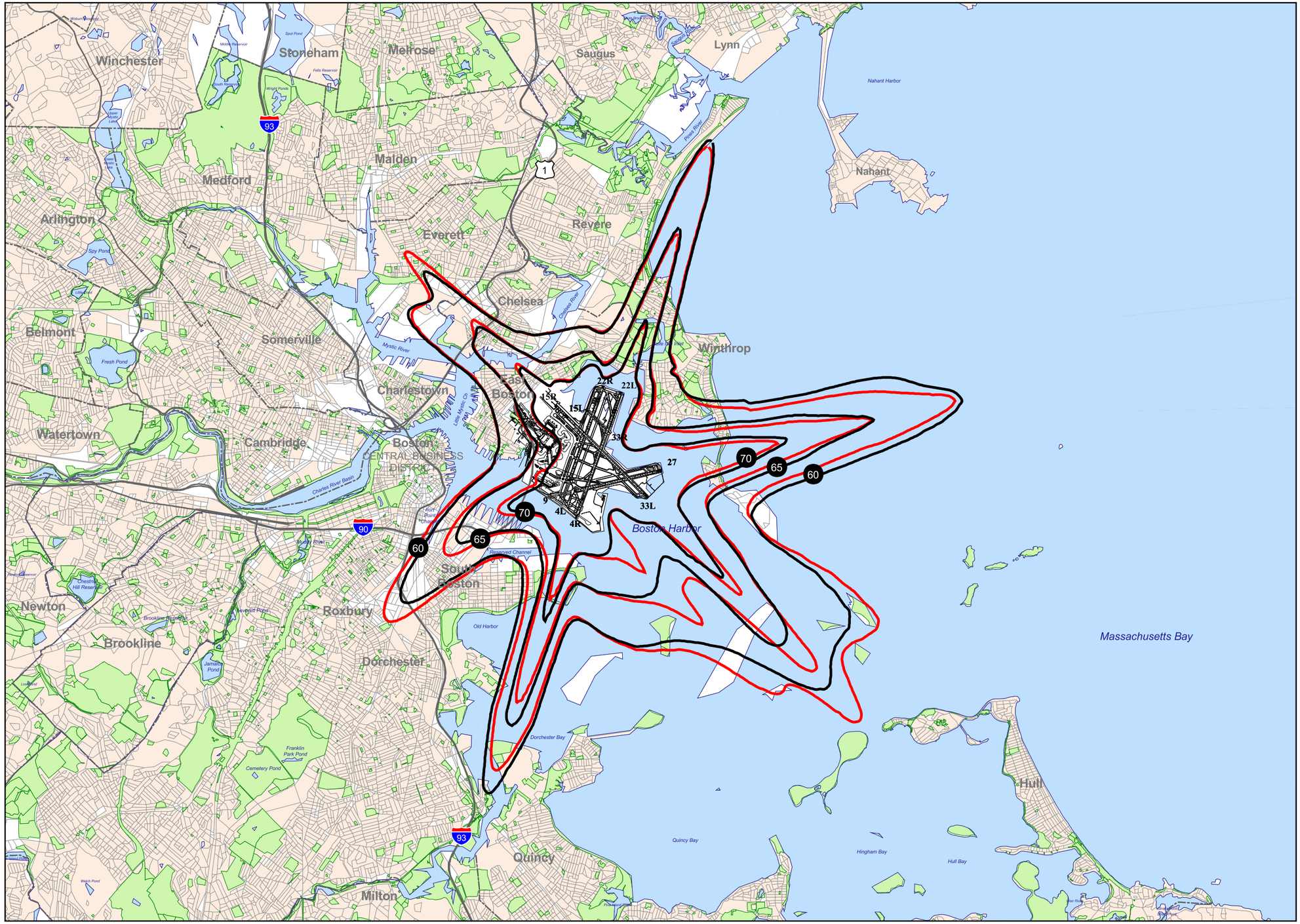
Note: Mileage rings are for reference only and do not indicate actual distance along the flight path.

Detailded flight tracks, including altitudes, are presented in Chapter 5 (figures 5.2-1 & 5.2-2) and Chapter 6 (figures 6.2-1, 6.2-2, 6.2-3 & 6.2-4) of the Supplemental DEIS.

Figure ES-9

Modeled Flight Tracks for Aircraft on All Existing Runways & Runway 14/32

7676-FIG-ES-9.p65



Legend

No Action Alternative 29M Low

60, 65 and 70 DNL

Preferred Alternative 29M Low

60, 65 and 70 DNL

Open Space

Census Blocks

Populated

Non-Populated

N

0 0.5 1 1.5 Miles

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Figure ES-10

Day/Night Sound Levels
29M Low
No Action & Preferred Alternative
Levels 60, 65 and 70 dB DNL Contours

Source: Harris Miller Miller & Hanson

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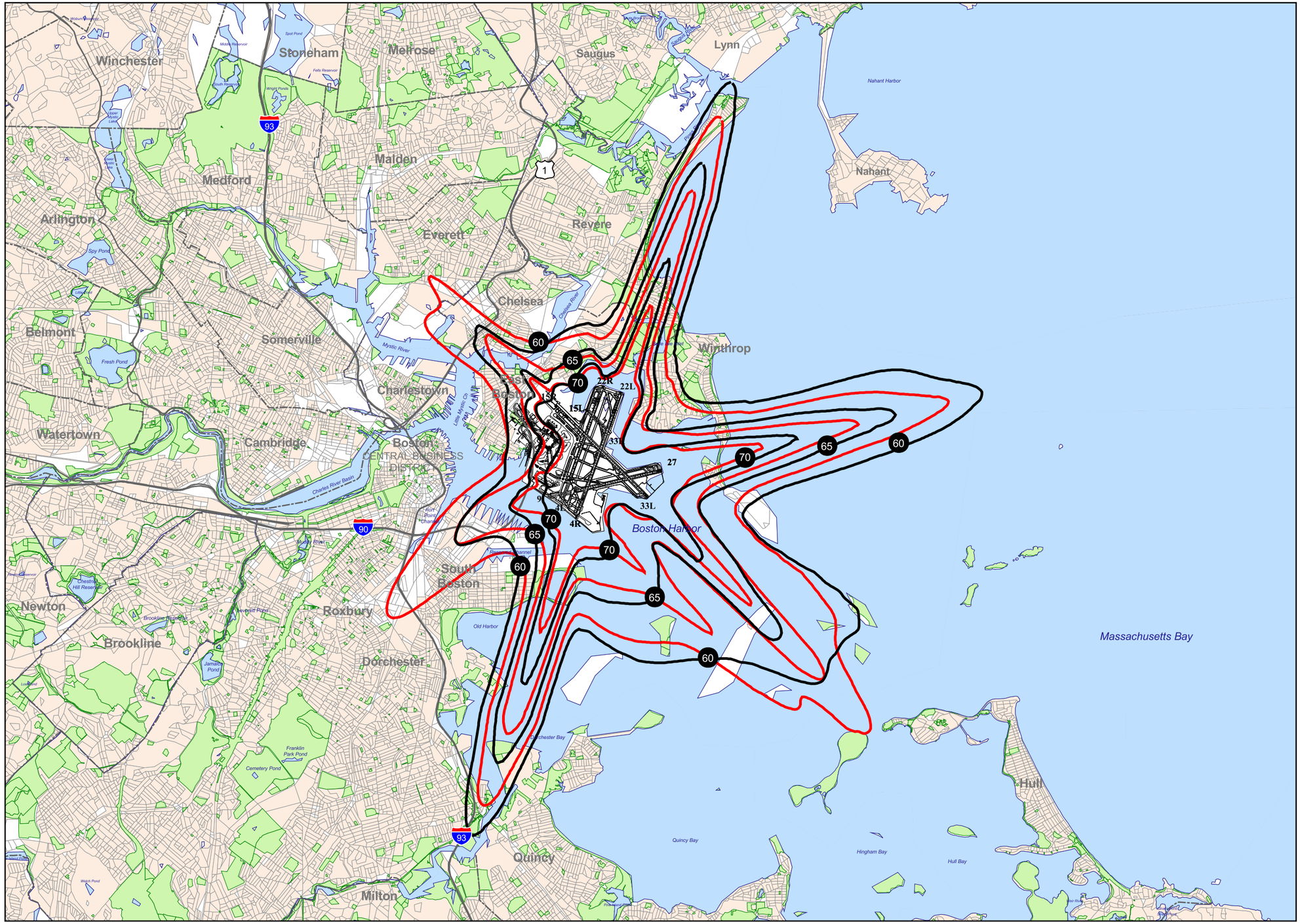

Legend

No Action Alternative 37.5M High

60, 65 and 70 DNL

Preferred Alternative 37.5M High

60, 65 and 70 DNL

Open Space

Census Blocks

Populated

Non-Populated

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Figure ES-11

Day/Night Sound Levels
37.5M High
No Action and Preferred Alternatives
Levels 60, 65 and 70 DNL Contours

Source: Harris Miller Miller & Hanson

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ES.8.2 Air Quality

Implementation of the Preferred Alternative would produce a reduction in emissions and an improvement in ambient air quality compared to the No Action Alternative. These benefits reflect improved airfield efficiency and shorter delay periods. The Preferred Alternative would not cause emissions to exceed annual General Conformity threshold[12] levels, nor is it a regionally significant action. The Preferred Alternative is therefore presumed to conform to the State Implementation Plan (SIP), and therefore the FAA need not make a conformity determination.

The effects of the northwest wind restriction on air quality conditions are bounded quantitatively by the analytical results previously derived for the No Action and unrestricted Preferred Alternatives. Even with the 10-knot wind restriction, total emissions are expected to be less than those anticipated under the No Action Alternative, and ambient concentrations of the criteria air pollutants (i.e. CO, NO_2, PM) and volatile organic compounds (VOCs) are expected to remain well within EPA guidelines and would not cause violations of the National Ambient Air Quality Standards (NAAQS).

ES.8.3 Environmental Justice

Federal environmental impact analysis standards require review and a determination to assess whether the proposed Project causes a high and significant adverse environmental impact and, if so, whether this significant adverse impact falls disproportionately on any low-income or minority populations. For this Final EIS, the noise exposed population analysis was updated to reflect the recent release of Census 2000 population data.[13] While the Census 2000 population data indicate that the minority population in the communities surrounding Logan has increased since the 1990 census, the minority percentage within the 65 dB DNL contour for both the No Action and Preferred Alternatives continues to indicate that minority populations do not suffer disproportionately from Airport noise impacts. Consistent with the findings of the Draft EIS/EIR and the Supplemental DEIS/FEIR, the updated analysis in this Final EIS shows that the Preferred Alternative does not cause a disproportionately high and significant adverse impact on minority populations.

The additional area within the 65 DNL contour associated with the Preferred Alternative includes a predominantly Hispanic neighborhood in Chelsea that is predicted to experience an increase of 0.6 dB or less under the near-term 29M Low Fleet – the worst-case scenario based on total noise exposure. Under the FAA standard of 1.5 dB, this change is not considered a significant adverse impact.

12 General Conformity thresholds: The standards established by the Commonwealth of Massachusetts and the National Ambient Air Quality Standards for six criteria air pollutants, including CO, NOx, PMs which conform with the attainment and maintenance of air quality levels as required by Massachusetts Air Quality Standards, 310 CMR 6.00 and 7.00 and 40 CFR 50.4-50.12.

13 Since the US Census Bureau will not be releasing income data from Census 2000 until summer 2002, only the population analysis could be updated to reflect Census 2000 data for the Final EIS.

Furthermore, mitigation of the increased noise will be provided to the affected community in the form of residential sound insulation.

As with the unrestricted Preferred Alternative, there is no disproportionately high and significant adverse impact on minority and low-income populations caused by the Preferred Alternative with a 10-knot northwest/southeast wind restriction.

ES.8.4 Other Environmental Impacts

Table ES-4 summarizes the other environmental analyses presented in the Supplemental DEIS/FEIR. In most cases, the Preferred Alternative has no significant impact, but when impacts do occur, the proposed mitigation commitment is noted.

Since a northwest/southeast wind restriction on Runway 14/32 would not involve any additional on-airport construction, the restriction would not result in any impacts to biotic communities, water resources, or soil/sediment resources.

ES.8.5 Cumulative Impacts of the Preferred Alternative

The Airside Project improvements focus on reducing aircraft operating delays and enhancing safety. They have independent utility, and will not stimulate, preclude or otherwise impact other development anticipated as part of Massport's landside planning efforts. The Airside Project noise and air quality impact analyses are cumulative because they examine all aircraft operations, both in flight and on the ground. By reducing delays, the Preferred Alternative provides an air quality benefit. A cumulative air quality benefit is achieved as a result of the net effect of the Airside Project, the Logan Modernization landside projects, and the Central Artery/Tunnel (CA/T) improvements, which all independently produce positive air quality benefits. In addition, the Preferred Alternative reduces noise exposure for the most severely impacted areas, compared to the No Action Alternative. For those people that experieince an increase in noise relative to the No Action Alternative, mitigation will be provided by sound insulating those residences that fall within the 65 dB DNL contour for the 29M Low Fleet scenario.

Table ES-4
Summary of Other Environmental Impacts of the Preferred Alternative

Impact Category	Summary	Mitigation
Land Use and Social Impacts	The only land use dislocation associated with construction of Runway 14/32 involves some tenants in the South Cargo Area.	Massport will provide relocation assistance as required under applicable law to mitigate this impact.
Cultural Resources	The FAA has determined with concurrence from the State Historic Preservation Officer (Massachusetts Historical Commission) that the proposed project will not adversely affect historic properties. The Preferred Alternative will neither use land from a Section 4(f) resource, nor adversely affect the normal activity or aesthetic value of a public park, recreation area, wildlife refuge or historic site. The Preferred Alternative does not add any new parklands within the 65 DNL contour. The Boston Harbor Islands are already within the No Action 65 DNL contour, while the Arnold Arboretum, Emerald Necklace and Franklin Park are well outside the 65 DNL contour.	No Adverse Effect/ No Significant Impacts Historic homes within the 65 dB DNL contour will be sound insulated in accordance with the Secretary of the Interior guidelines.
Biotic Communities	The Centerfield Taxiway and the Taxiway Delta extension will result in the loss of an area of Upland Sandpiper habitat. There are no significant impacts to terrestrial vegetation, wetlands or typical wildlife.	An on-site and off-site mitigation plan has been developed in consultation with the Massachusetts Natural Heritage and Endangered Species Program (NHESP) to mitigate impacts to the Upland Sandpiper, consistent with aircraft safety. No Other Significant Impacts.
Water Quality	Construction of Runway 14/32 and the taxiway improvements will create additional impervious surfaces at Logan, and thus will increase the peak rate of runoff from Logan to Boston Harbor by approximately 4 percent; however, the general quality of runoff under the Preferred Alternative is expected to be similar to present runoff. The existing water quality in Boston Harbor will not be affected by the construction of the runway or taxiway improvements; therefore, there are no adverse water quality impacts. The Preferred Alternative will conform to applicable NPDES permit requirements.	No Significant Impacts
Soils	All soils removed from the project site will be managed in accordance with state regulations and Massport policy to minimize impacts. Appropriate sediment and erosion controls will be employed during construction, and disturbed soils will be re-vegetated.	No Significant Impacts
Construction	Construction of the runway and taxiway improvements will occur on the existing airfield over a five-year phased construction period.	Construction will be managed to minimize air, noise, and other impacts to the adjacent community. Construction vehicles will access the airport on designated haul routes via the Ted Williams Tunnel or Route 1A, and thus would not impact local residential streets adjacent to Logan. All increases in noise associated with construction of the Airside Project are less than 5 dB, and therefore are considered to have “no impact” according to Federal Highway Administration (FHWA) standards.

Construction traffic associated with the Preferred Alternative would not add significantly to the existing volume of traffic on the regional highway system. Peak Airside Project truck traffic is estimated to be approximately 184 trips per day.[14] Construction vehicles associated with the Preferred Alternative represent less than 0.2 percent of the total traffic volume, and will not have a significant impact on the regional highway system.

The cumulative construction impacts are based on published environmental filings to date. Any delay in airport-wide projects would only diminish the total cumulative construction impacts. The increase in noise levels over the ambient noise level as a result of the construction of the Preferred Alternative and the other concurrent construction projects (i.e., construction of the terminal area roadways, International Gateway, and CA/T Contract C08A1) ranges from 0 decibels to 2.1 decibels. According to the Federal Highway Administration (FHWA) noise criteria, increases of less than 5 dBA are categorized as "no impact."

The standard construction mitigation measures developed for the Logan Modernization Program, and for work on the airfield, will be applied to minimize construction noise and air quality impacts.[15]

ES.9 Project Issues Raised During the Environmental Review Process

Several questions relating to the Airside Project, and the Runway 14/32 proposal in particular, have been raised during the public review and comment process. This section discusses project issues that were common to a number of comments or that led FAA to examine additional information as part of the analytic effort reflected in this Final EIS. This section is not a summary of all the comments received on the Supplemental DEIS/FEIR. Responses to comments are provided in Volumes 2-6 of this Final EIS.

These issues are:

- **Regionalization:** What is the status of efforts to increase utilization levels at other airports (Manchester NH, Providence RI, and Worcester MA) and other modes (high-speed rail) within the region? Are there additional steps that could be pursued within this regional transportation network that would justify eliminating or deferring the Airside Project Preferred Alternative?
- **Demand Management:** Are there administrative actions to manage aircraft demand at Logan that would provide similar operational efficiencies and would justify the elimination or deferral of the Preferred Alternative?

14 92 round trips equal 184 total trips.
15 Refer to Section 7.5 of the Supplemental DEIS/FEIR.

- **Runway Utilization:** What is the expected utilization level of the proposed 5,000 foot unidirectional Runway 14/32 by regional jets, particularly in light of (i) the recent and projected growth of this category of aircraft in the fleets of Logan carriers, and (ii) the recent experiences at other airports (i.e., Baltimore and Philadelphia)?
- **Near-Term Regional Jet Fleet:** Would the operational benefits associated with proposed unidirectional Runway 14/32 change significantly under a near term forecast scenario (i.e., 29 million annual passengers) with a higher number of regional jets than the previous 29 million passenger forecast scenarios analyzed in the Draft EIS and Supplemental DEIS?
- **Induced Demand:** Will the implementation of the Preferred Alternative stimulate or induce additional demand for air travel at Logan?
- **Updated 2000 Census:** Have the conclusions from the noise impact and environmental justice analyses set out in the Draft EIS and Supplemental Draft EIS changed as a result of analysis of recently released 2000 census data?
- **Additional Analysis of Key Technical Issues:** Would an independent analysis support the numbers and types of regional jets in the 29M RJ and 37.5M High RJ fleets? Would a second assessment support the Airside assumptions and analysis regarding regional jet runway utilization, forecast delay savings, and runway capacity?
- **Runway 14/32 Wind Restriction:** What are the operational and environmental implications of restricting the use of Runway 14/32 based on the occurrence of various northwest and southeast wind levels?
- **Safety Benefits of the Taxiway Improvements and Reduced Minimums:** What are the safety benefits associated with the proposed taxiway improvements and the reduced minimums?
- **Impacts of the Centerfield Taxiway:** What are the environmental and operational impacts of the Centerfield Taxiway? If a decision on the Centerfield Taxiway were deferred so that FAA could conduct an additional study to evaluate potential beneficial operational procedures, how would that affect the operational and environmental impacts associated with the other improvement concepts in the Preferred Alternative?

- **Runway Capacity and Delay Modeling Assumptions:** What was the modeling approach (including various assumptions) used in the aircraft delay analyses set out in the Draft EIS and Supplemental Draft EIS?
- **Consistency of Airside Delay Modeling with Published Delay Statistics:** Are the modeled delay estimates for Logan consistent with published FAA/DOT delay statistics?

These issues are addressed in detail in Chapter 3 of this Final EIS and are summarized below.

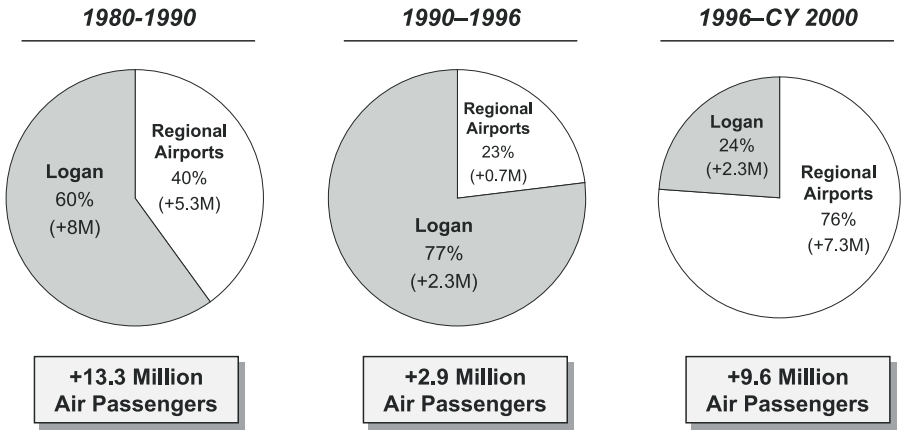
ES.9.1 Regional Transportation Planning and Development

Both the Draft EIS/EIR and the Supplemental DEIS/FEIR extensively examined the potential for greater use of regional airports and other transportation modes to alleviate future demand for Logan services and concluded that the Preferred Alternative is needed along with regional transportation efforts.

The Preferred Alternative is an essential component of a broader regional transportation strategy that has been evolving for more than a decade. Since 1989, a series of regional airport planning studies have examined various strategies for accommodating the growing demand for inter-city travel and relieving congestion at Logan Airport. Each study included active participation from the FAA, state-wide aviation agencies, and other New England airports. These regional planning studies have consistently recommended the development of high-speed rail in the Northeast Corridor and a growing role for the regional airports, *in addition to* infrastructure improvements at Logan, as essential elements of a comprehensive and balanced regional transportation plan for high-speed inter-city travel. To facilitate the development of regional airports, the FAA began prioritizing its Airport Capital Improvement Plan (ACIP) as early as 1990 to reflect the importance of Airport Improvement Program (AIP) funding for development projects at the T.F. Green/Providence and Manchester Airports. More than $200 million of AIP funds have been spent at the regional airports since 1990.

The development of regional airports is already having an impact on the demand for Logan Airport services. Over the past several years, there has been significant service development and passenger growth at the regional airports, especially T.F. Green/ Providence and Manchester. Since 1996, the number of air passengers using T.F. Green has more than doubled (+118 percent), while Manchester's air passenger traffic more than tripled (+251 percent). In addition to service expansion by incumbent airlines, the regional airports have also benefited from the low-fare services offered by Southwest Airlines, Delta Express and MetroJet. As a result, the regional airports have recaptured air passengers that originate within their primary markets areas but formerly used Logan Airport to meet their air travel needs. Logan's average passenger growth has slowed to just 2.2 percent annually since 1996, compared to 24.9 percent annual passenger growth at the T.F. Green, Manchester and Worcester Airports combined. The slowing of Logan Airport's growth rate at a time when the national and regional economies were rapidly expanding is a clear indication that regional airports diverted traffic from Logan Airport. A comparison of regional passenger growth trends shows that, since 1996, 8 out of 10 net new air passengers (the growth between 1996 and 2000) in New England flew from a regional airport rather than Logan. Prior to 1996, the reverse was true (Figure ES-12).

Figure ES-12
Distribution of New England Passenger Growth – Regional Airports vs. Logan



Note: Regional airports include Providence, Manchester, Worcester, Bangor, Burlington, Hartford, New Haven, and Portland.
Source: Airport Records and US DOT, Form 41 schedules.

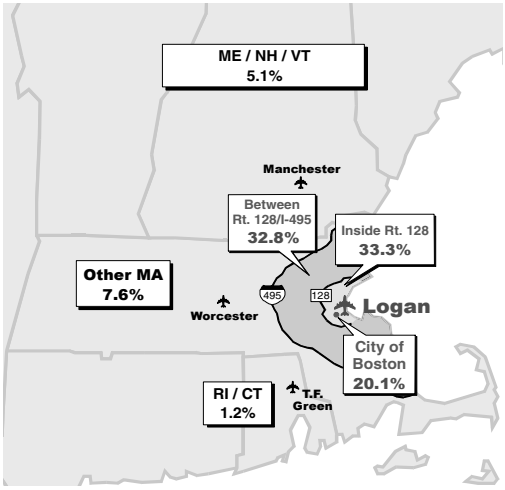
The impact of activity at regional airports on Logan's passenger growth is further confirmed by Massport's *1999 Logan Air Passenger Survey* which found that Logan Airport attracted fewer passengers from the region outside of I-495 than it did in 1996. The survey demonstrates that Logan attracted 3.3 million passengers from outside I-495 in 1999, compared to 4.8 million in 1996 (Figure ES-13).

Figure ES-13
Logan's Passenger Demand

Distribution of Logan Passengers by Ground Origin

	1996	1999	Change
Boston	21.4%	20.1%	-1.3
Inside Rt. 128	27.7%	33.3%	+5.6
Between 128 & I-495	29.2%	32.8%	+3.6
Subtotal	78.4%	86.2%	+7.9
Other MA	8.6%	7.6%	-1.0
ME/NH/VT	10.5%	5.1%	-5.4
RI/CT	2.5%	1.2%	-1.3
Subtotal	21.6%	13.9%	-7.7

Note: May Not Add Due to Rounding.



Even with the successful development of regional transportation alternatives to Logan, there is still a need for the Airside Project. Demand for air service out of Logan will continue to be substantial within its core service area. The analyses in the Draft EIS/EIR and the Supplemental DEIS/FEIR demonstrate that delays caused by airside

inefficiencies will persist at Logan even as the use of regional alternatives to Logan increases. Although regional transportation development has merit in distributing the region's demand, it does not address a unique aspect of Logan's airside delays, i.e., the decline in capacity during northwest wind conditions. Construction of Runway 14/32 is the only measure that would provide the opportunity for Logan to maintain its normal operating capacity during northwest wind conditions.

Increasing the utilization of outlying airports and rail as alternatives to using Logan Airport are essential goals for accommodating continued growth in the region's long-term demand and reducing the region's over-reliance on Logan Airport. The Airside Project analysis estimates that regional airports and rail could divert up to 7.3 million air passengers from Logan over the next decade. To further the role of regional airports, the FAA, Massport, the Massachusetts Aeronautics Commission, the five New England states, the Manchester Regional Airport, and the Rhode Island Airport Corporation are conducting the *New England Regional Aviation System Plan*. (Appendix C of the Final EIS contains the study scope of work.)

ES.9.2 Demand Management Options

While physical improvements such as Runway 14/32 and the taxiway improvements are intended to improve airfield safety and efficiency, and to reduce delays by providing the opportunity for the Airport to maintain its full runway capacity, demand management addresses delays that occur only when flights are scheduled beyond the Airport's full capacity. The elements of the Preferred Alternative provide meaningful delay reduction benefits under all current and future scenarios; demand management provides significant benefit only when overscheduling conditions are present.

Peak period pricing was evaluated as a demand management mechanism against a broad range of potential future fleet scenarios. This market-based approach was selected from among alternative mechanisms because its application is within Massport's authority as airport proprietor and because a pricing approach avoids potential anti-competitive aspects of slot controls and permits free market decisions to determine the type of services to be provided at Logan.

The analysis of Logan delays contained in the Draft EIS/EIR and Supplemental DEIS/EIR found that airline overscheduling does not represent a significant cause of recent delays at Logan Airport. For this reason, peak period pricing was not included in the Preferred Alternative for immediate implementation at Logan. For example, under the 29M Low Fleet scenario, which most closely approximates recent flight levels at Logan, the addition of peak period pricing to the proposed airside improvements would have reduced annual runway delays by only 3,000 additional hours—an incremental gain of just 2.2 percent compared with the 20.6 percent reduction associated with the Preferred Alternative. This limited benefit reflects the absence of airline overscheduling within this near term future fleet.

In contrast, peak period pricing was shown to produce significant delay reduction benefits under potential future high fleet conditions. Under the long-term 37.5M High Fleet scenario, overscheduling conditions are clearly present with annual flight volume more than 20 percent above recent levels. Under these conditions, peak period pricing was estimated to produce an incremental reduction in Logan runway delays of 80,000 annual hours—or 24 percent of delays in the No Action Scenario—if it is initiated in addition to the airside improvements contained in the Preferred Alternative.

Subsequent to filing the Supplemental DEIS/FEIR, Massport committed, in its Section 61 Findings pursuant to the Massachusetts Environmental Policy Act, to the implementation of an enforceable peak period pricing program at Logan Airport, or an alternative demand management program with comparable effectiveness. The objective of this program will be to avoid or reduce delays associated with overscheduling of Logan Airport's available runway capacity during favorable weather conditions. The purpose behind this near-term implementation is to have a defined demand management program in place before an overscheduling condition occurs. This will provide the opportunity for the airlines to make future aircraft fleet and scheduling decisions with advance knowledge of potential future operating conditions at Logan.

The FAA understands that Logan Airport is one of the nation's most delayed airports and that Massport has committed to and will propose to implement a demand management program to reduce overscheduling delays. The FAA expects that any such program that is proposed for implementation at Logan will be consistent with applicable federal law. The U.S. DOT and FAA are examining the broader policy implications of demand management options at congested airports throughout the United States in order to provide appropriate public policy tools that focus on ways to reduce delays, improve capacity management, enhance competition, and promote the efficiency of the overall aviation system. In connection with this effort, the U.S. DOT published notices requesting comment on the broader policy implications of demand management options at congested airports throughout the U.S. In light of the events of September 11th, those notices have been temporarily suspended until the aviation industry stabilizes. The DOT intends to renew this effort when appropriate.

ES.9.3 Regional Jet Utilization of Runway 14/32

One of the FAA's central concerns has been the ability of regional jets to land on the proposed 5,000 foot unidirectional Runway 14/32. This issue has also been raised in a number of comments on the Supplemental DEIS/FEIR. Four specific concerns related to the growth in regional jets and the proposed 5,000 foot runway are:

- How will the influx of regional jets in the fleet affect the delay reduction benefits of the Preferred Alternative?;
- Do the Airside fleets reflect the mix of regional jet aircraft models that will operate at Logan?;

- What does the experience regarding RJ runway utilization at other U.S. airports with 5,000 foot runways indicate about Runway 14/32 at Logan?; and
- Will regional jets utilize the proposed 5,000-foot runway at Logan?

ES.9.3.1 Delay Reduction Benefits With Increased RJ Activity

Massport and FAA recognized the rapid growth in RJs in the U.S. airline fleet and at Logan and addressed this emerging trend by developing a new short-term 29M RJ Fleet specifically for this Final EIS in addition to a long-term 37.5M High RJ Fleet which was developed for the Supplemental DEIS/FEIR. Regional jet activity under these forecast scenarios represent significant growth beyond today's levels of RJs.

The results of the 29M RJ and 37.5M High RJ analyses are consistent with the results of the Airside fleets described in the Draft EIS/EIR. The Preferred Alternative would:

- Reduce runway delays by 27 to 29 percent;
- Provide relief to those people subjected to the highest noise impacts while providing controllers with the opportunity to reduce reliance on north/south runway configurations and increase activity over the water compared to future scenarios without Runway 14/32.
- Reduce emissions of carbon monoxide (CO), nitrogen oxides (NOx), total volatile organic carbons (VOCs), and PM_{10}.

ES.9.3.2 Mix of RJ Types in the Future

The 37.5M High RJ Fleet mix reflects existing RJ activity at Logan, the terminal redevelopment plans of American and Delta, and the fleet plans of other Logan carriers. The near-term 29M RJ Fleet represents an interim point between recent activity and the long-term projections.

ES.9.3.3 RJ Runway Utilization at Other Airports

The limited RJ use of 5,000 foot runways at the Baltimore and Philadelphia airports is due to specific circumstances that are unique to those airports and are not applicable to Logan. At Baltimore, airport noise restrictions explicitly prohibit the use of its 5,000 foot runway by commercial jets. At Philadelphia, use of the 5,000 foot runway produces dependencies that lower the airfield's capacity for mainline jets. The reported lack of RJ use of commuter runways at these two airports is not an indication that a 5,000 foot runway could not service RJ arrivals at Logan or at other airports.

ES.9.3.4 Regional Jet Utility of a 5,000 Foot Runway

Each of the primary RJ types at Logan is certificated by manufacturers and the FAA to land safely on a 5,000 foot runway under dry conditions. Under northwest wind

conditions when Runway 14/32 would be used most frequently, headwinds would reduce required landing distances. In any event, using the more conservative assumptions from the FAA's independent analysis, nearly 80 percent of Logan's current RJ fleet and more than 70 percent of the projected 37.5M High RJ Fleet would be able to utilize the proposed 5,000 foot Runway 14/32.

Representatives of Logan's two largest regional jet operators—American Eagle and ACJet—have provided confirmation of their intentions to utilize Runway 14/32. Statements from these carriers and the Air Transport Association of America affirming the utility of Runway 14/32 are included in Appendix F of this Final EIS.

ES.9.4 Near-term Regional Jet Fleet

In response to continued concerns about the near-term impact of regional jets, a 29M RJ Fleet was developed for this Final EIS. The results indicate that the Preferred Alternative would continue to produce substantial delay reduction benefits, and that the delay reduction and changes in runway utilization would produce similar environmental impacts to those identified from the previous analyses. Under this near term scenario:

- The Preferred Alternative will reduce runway delays compared to the No Action Alternative, saving over 54,000 hours of flight delays per year.
- Runway 14/32 would reduce reliance on the north/south runway configurations at Logan, and would nearly triple the number of operations with overwater routings.
- The Preferred Alternative will result in slight air quality improvements, when compared to the No Action Alternative.
- The noise exposure impacts of the Preferred Alternative relative to the No Action Alternative have been bracketed by previous analyses. In all cases, the number of residents exposed to the highest noise levels will be reduced by the Preferred Alternative.

ES.9.5 Runway 14/32 and Induced Demand

Many comments on the Supplemental DEIS/FEIR suggested that construction of Runway 14/32 and implementation of the other proposed airside improvements will stimulate an increase in passenger traffic or aircraft operations at Logan. An understanding of the nature of aviation demand, however, makes it clear that neither Runway 14/32 nor any of the other improvements comprising the Preferred Alternative will have material bearing on the level of demand for air transportation at Logan.

Growth in demand for Logan Airport will be principally driven by local and national economic conditions and by competition and pricing within the airline industry. Certain types of runway projects, such as the one at Dallas-Ft. Worth International Airport, have the potential to induce demand by materially increasing the airport's overall hourly

throughput. The Logan Airside Project does not involve any such action, however. The Preferred Alternative, specifically unidirectional Runway 14/32, will not increase Logan's typical airfield capacity of approximately 120 operations per hour that is available about 80 percent of the time, nor will it encourage or induce an increase in aircraft operations. Instead, Runway 14/32 will provide the opportunity for Logan to operate more reliably by maintaining this capacity during periods of moderate to high northwest winds which now reduce Logan's operating capability from the three-runway configurations typically available to configurations with just one or two runways. Runway 14/32 will increase Logan's reliability, but will not increase the airport's normal operating capacity. This conclusion is consistent with FAA's *Airport Capacity Benchmark Report 2001*,[16] which determined that Logan has an existing good weather capacity of 118 to 126 operations per hour. The *Benchmark Report* also concluded that the new unidirectional runway would not increase the good weather capacity of Logan Airport, but instead would help mitigate delays encountered during adverse wind conditions.

Furthermore, airlines at Logan are providing services based on market demand, and recent service levels are below the airport's capacity. Since there is no latent demand that Runway 14/32 could activate, the increased reliability associated with Runway 14/32 will not induce additional demand at the airport. Additionally, the broad range of forecasts considered in the Airside Project operational and environmental analyses encompasses all of the potential impacts that would be associated with any growth scenario.

Based on the economic factors driving Logan demand, the fact that construction of Runway 14/32 does not increase the maximum throughput of the airport beyond the 120 hourly operations typically available under good weather conditions, and the fact that demand at Logan is not constrained, Runway 14/32 will not induce additional demand for air passengers or operations at Logan that would not otherwise occur.

ES.9.6 Updated Noise Impact and Environmental Justice Analysis Using Census 2000

The release of the Census 2000 data for Massachusetts subsequent to the filing of the Supplemental DEIS/FEIR prompted several reviewers to note that the availability of more recent population counts might affect the noise impact and environmental justice conclusions presented in the Draft EIS/EIR and the Supplemental DEIS/FEIR. To address these concerns the noise affected populations for all of the Project Alternatives and all of the fleet scenarios presented in the Airsde EIS Documents have been recalculated for this Final EIS using Census 2000 data. Likewise the Environmental Justice analysis was also updated to reflect Census 2000 populations.

The use of Census 2000 populations does not alter the noise impact conclusions presented previously in the Draft EIS/EIR and the Supplemental DEIS/FIER. Implementation of Runway 14/32 reduces the population in the most severely impacted communities within the 70 and 75 dB DNL noise contours, regardless of the fleet forecast.

16 *Airport Capacity Benchmark Report 2001*, Federal Aviation Administration, April 2001.

The communities benefiting most from reduced exposure levels are Winthrop and East Boston. Revere also benefits from reduced exposure at these highest levels under most future fleet scenarios. No community would experience an increase in exposure to DNL levels above 70 or 75 dB as a result of the Preferred Alternative.

Analysis of the Census 2000 data also supports the Environmental Justice conclusions presented in the Supplemental DEIS/FEIR regarding minority populations. Although the minority population of the communities around Logan Airport has increased since 1990, the overall conclusion that significant adverse noise impacts of the Preferred Alternative are not predominately borne by a minority population remains valid. Within the 65 dB DNL contour for the Preferred Alternative under the 29M Low Fleet scenario, only 34 percent of the population is minority, compared to a minority population of 48 percent in the surrounding communities of Boston, Chelsea, Revere and Winthrop.

ES.9.7 Additional Analysis of Key Technical Issues

In August 2001, FAA asked the MITRE Corporation's Center for Advanced Aviation System Development (MITRE) for assistance in addressing key project issues relating to runway utilization and capacity and delay modeling. MITRE was asked to review four questions that principally related to the operational utility and delay reduction benefits of the proposed unidirectional Runway 14/32 and provide an independent assessment of the EIS technical analysis relevant to each issue. The four questions and MITRE's anlaysis of each are summarized below:

1) **<u>Regional Jet Forecasts</u> – In the 29M RJ and the 37.5M High RJ fleet forecasts, are the percentage of regional jets and the distribution by RJ type reasonable?**

MITRE concluded that the near-term 29M RJ scenario is consistent with current trends and represents a reasonable estimate of the number of RJ flights and the distribution of flights by RJ aircraft type. In addition, MITRE found that the EIS projections for RJ activity in the 37.5 High RJ fleet were within the range of reasonable long-term forecasts. If recent trends towards increased activity levels with regional jets continue, and airport capacity constraints do not force a shift to use of larger aircraft, then MITRE concluded that RJs may capture a somewhat larger percentage of the long-term future fleet than forecast in the 37.5M High RJ fleet. MITRE also concluded that the long-term RJ forecasts probably understate the future proportion of Fairchild-Dornier 328Jets in the Logan fleet mix.

2) <u>Runway Usage for Regional Jets</u> – Are the assumptions in the Airside Project EIS regarding the types of RJs that can use Runway 14/32 for arrivals and departures in various wind and runway conditions valid?

MITRE was asked to review regional jet takeoff and landing capabilities, and held discussions with industry representatives and RJ operators in order to validate the EIS runway utilization assumptions that were developed by the earlier FAA analysis (see Appendix C of the Supplemental DEIS/FEIR). The MITRE review confirmed the reasonableness of the EIS assumptions concerning RJ runway use.

3) <u>Delay Results</u> – Are the delay savings forecast in the EIS reasonable, particularly under long-term conditions when large delays are predicted?

MITRE reviewed the projections of delay growth in the EIS, assessing the modeled increases in average delays with particular focus on the long-term 37.5M fleet scenarios. In certain of these scenarios, No Action delay levels are substantial due to the high number of total operations and serious overscheduling during peak periods. MITRE concluded that delay growth in the 2015 37.5M Low No Action fleet scenario seemed high, but more reasonable than the delay growth predicted for the 37.5M High RJ and 37.5M High No Action fleet scenarios.

MITRE's conclusions were based upon the fact that Logan delays currently approach those for the most congested U.S. airports. In their judgment, delays at Logan are already at or near the limits that airlines and passengers will tolerate. MITRE therefore concluded that airlines, Massport, or the FAA would almost certainly act to limit delay growth before delays could reach the high No Action levels predicted with the long-term EIS fleets. This is consistent with the Airside Project EIS analysis.

The objective of the proposed peak period monitoring system, is to implement peak period pricing or an alternate form of demand management before delays reach the levels reflected in the long-term High and High RJ fleet scenarios. Since peak period pricing, a form of demand management, was explicitly considered as an improvement concept in the Airside Project EIS, the No Action forecast scenarios did not reflect the implementation of demand management initiatives. Rather, as a conservative approach, the Airside Project EIS used unconstrained No Action Alternatives. These long-term High fleet forecasts represent a realistic outer range of unconstrained activity and provide a conservative upper bound for environmental impacts under the No Action Alternative.

4) <u>Limited Capacity Analysis</u> – How do the capacities of two specific runway configurations, 33L/32 & 27 (proposed) vs. 22L/R & 27 (existing), compare under visual conditions and calm winds?

MITRE developed independent capacity estimates for several specific runway configurations based on the 37.5M High RJ fleet mix. This analysis was structured to further examine the relative capacity rankings of the runway configurations, particularly as they relate to the portion of predicted delay reduction benefits that occur under visual conditions and calm winds.

MITRE developed capacities for four different runway configurations:

- Arrive 22L & 27 – Depart 22L & 22R
- Arrive 33L & 32 – Depart 33L & 27
- Arrive 32 & 27 - Depart 33L
- Arrive 33L & 32 – Depart 33L

The MITRE and Airside Project EIS capacity estimates are similar, with the Airside Project EIS modeling producing slightly lower capacities than the MITRE analysis for three of the four runway configurations examined. The key difference is that MITRE predicts that the 22L/R & 27 configuration has a slight capacity advantage over the 33L/32 & 27 configuration (115 hourly operations vs. 112 hourly operations), while the EIS capacity modeling shows a disadvantage (106 hourly operations vs. 118 hourly operations). In effect, while the EIS capacity analysis found the new configuration with Runway 32 to represent the second-highest-capacity runway configuration at Logan, MITRE's capacity analysis found that the new runway configuration ranked third, behind the 22L/R & 27 configuration.

While differing on the capacity rankings, MITRE concluded that the 33L/32 & 27 configuration would provide a capacity that was nearly as high as the 22L/R & 27 configuration, and that the addition of the new three-runway configuration would address Logan delays that occur during northwest winds and would provide more flexibility for distributing aircraft overflights.

Overall, FAA concludes that MITRE's analysis validates the purpose and need for Runway 14/32. MITRE's analysis showed that the runway will provide additional capacity under high northwest winds and that it will provide the operational flexibility to permit more frequent use of the northwest operating direction. FAA also concludes that the Airside Project EIS modeling assumptions and the methodology used throughout the EIS analysis are valid, and produce a reasonable representation of the range of environmental impacts associated with the proposed Airside improvements.

ES.9.8 Northwest/Southeast Wind Restriction on Runway 14/32

The delay reduction benefits of Runway 14/32 are principally realized during moderate to high northwest winds, when available airfield capacity declines as operations shift from Logan's normal three-runway configurations to the lower-capacity configurations Runways 33L and 27 or Runway 33L alone. With Runway 32 available for arrivals, the new 33L/32 & 27 runway configuration would substantially reduce northwest wind delays. By providing this additional high-capacity three-runway configuration, Runway 14/32 could also enable a redistribution of flights that would improve performance relative to PRAS goals and provide benefits to residents impacted by the heavily used north/south runway configurations.

However, with increased use of the new northwest configuration, departures from Runways 27 and 33L would also increase above current levels. This predicted increase in aircraft overflights affects communities to the west and northwest of Logan and has been a source of controversy as evidenced by numerous public comments. Although such a redistribution of flights is consistent with the PRAS goals, the Community Advisory Committee (CAC) has withdrawn its support for PRAS, and Massport, with support from the FAA, has committed to reassess the PRAS program as part of its Section 61 Findings.

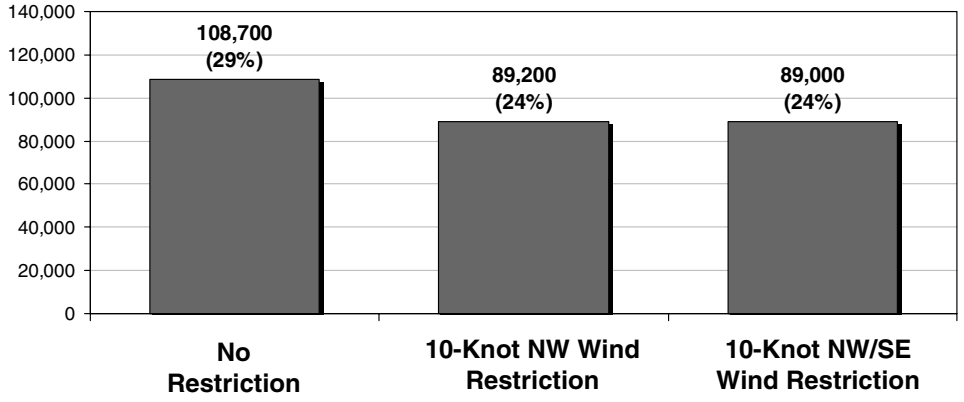
In an attempt to address these public concerns, the SDEIS Panel process identified wind/weather restrictions on the use of Runway 14/32 as one area for additional study by the FAA and Massport. The Supplemental DEIS/FEIR specifically evaluated the delay and runway use implications of a northwest wind restriction at various wind speeds of 5, 10, 15, 20, and 25 knots. This analysis demonstrated that a 10-knot northwest wind restriction could be an effective mechanism for limiting the changes in utilization of Runways 27 and 33L, while still preserving the northwest wind delay benefits of Runway 14/32. However, further analysis of the 10-knot northwest wind restriction in the Final EIS identified an unanticipated consequence, an increase in nighttime arrivals over communities to the northwest of the airport. To mitigate this additional runway use impact of the northwest wind restriction, a northwest/southeast (NW/SE) restriction on the use of Runway 14/32 was analyzed in this Final EIS.

Just as a northwest wind restriction would limit the redistribution of flights that could occur with the unrestricted use of Runway 32 for arrivals, a southeast wind restriction can similarly prevent a redistribution of overflights due to the availability of Runway 14 for departures. As with a northwest wind restriction, a northwest/southeast restriction can limit changes in runway utilization while preserving the primary delay reduction benefits of Runway 14/32. The operational and environmental impacts of a 10-knot northwest/southeast operating restriction on Runway 14/32 are summarized below.

ES.9.8.1 Delay Reduction

- A 10-knot NW/SE wind restriction on the operation of Runway 14/32 would maintain most of the delay reduction benefits of the Preferred Alternative (refer to Figure ES-14). For the long-term 37.5 M High RJ fleet, the Preferred Alternative, with a 10-knot northwest/southeast restriction, would reduce delays by 89,000 annual hours, or 24 percent compared to the No Action Alternative. This compares to delay reduction of 108,700 hours (or 29 percent) with an unrestricted Preferred Alternative and 89,200 hours (or 24 percent) with a one-way, northwest wind restriction.

Figure ES-14
Annual Hours of Delay Reduction – 2015 37.5M High RJ Fleet with a 10-Knot Northwest/Southeast Wind Restriction



ES.9.8.2 Runway Use

- Like the northwest wind restriction, the NW/SE restriction would maintain the utilization of Runways 27 and 33L for jet departures at historic shares, preventing the shifts in runway use that were predicted with an unrestricted Runway 14/32. Similarly, runway use shares for the north/south runways and over-the-water arrivals would remain comparable to recent experience (see Table ES-5).

  - Use of Runway 27 for jet departures would be 15.4 percent with the NW/SE wind restriction compared to 15 percent in 2000 and 29.2 percent with an unrestricted Runway 14/32.
  - The share of jet departures utilizing runway 33L would be 5.7 percent with a 10-knot NW/SE wind restriction compared to 6 percent in 2000 and 10.8 percent with no wind restriction.

- With the NW/SE wind restriction, use of Runway 15R for nighttime jet arrivals would remain at one percent, the same as in CY 2000. Both an unrestricted runway and a runway that is only restricted in the northwest direction could produce an increase in the use of Runway 15R for nighttime jet arrivals.

- Utilization of overwater routings for arrivals would be 22.6 percent with the NW/SE wind restriction compared to 20 percent in 2000 and 40 percent with an unrestricted runway.

- With a 10-knot NW/SE restriction on Runway 14/32, the use of north/south runway configurations at Logan would remain at approximately 76 percent, the same share achieved in CY 2000. This compares to north/south runway usage of 56 percent with an unrestricted Runway 14/32 and 90 percent for the No Action Alternative.

Table ES-5
Runway Utilization with a Northwest/Southeast Wind Restriction – 2015 37.5M High RJ Fleet Scenario

			Preferred Alternative		
	CY 2000	No Action	Unrestricted	10-knot NW Restriction	10-knot NW/SE Restriction
Rwy 15R Nighttime Jet Arrivals	1.0%	0.7%	2.1%	3.3%	1.0%
Rwy 27 Jet Departures	15.0%	5.8%	29.2%	15.2%	15.4%
Rwy 33L Jet Departures	6.0%	2.0%	10.8%	5.6%	5.7%
Over-the-Water Arrivals	20.0%	10.0%	40.0%	22.0%	22.6%
North/South Runway Use	76.5%	89.8%	56.0%	75.8%	76.4%

Note: Nighttime hours are from 10 PM to 7AM.

ES.9.8.3 In-flight Noise

- In the 29M Low scenario, the Preferred Alternative with an unrestricted Runway 14/32 would reduce total population within the 75, 70, and 65 dB DNL contours compared to the No Action scenario. At the same time, population within the 60 dB DNL contour would increase with an unrestricted runway 14/32 (see Table ES-6).
- With a 10-knot NW/SE wind restriction, the Preferred Alternative would reduce the number of people within the 75, 70 and 65 dB DNL contours as well as the 60 dB DNL, when compared to the No Action Alternative (29M Low). Compared to the unrestricted Preferred Alternative, the northwest/southeast restriction would reduce the number of people within the 70, 65, and 60 dB DNL contours, but would result in a small increase (43 additional people) within the 75 dB DNL contour due to increased use of Runway 9 departures over Point Shirley. (See Table ES-6 and Figure ES-15.)

Table ES-6
Total Noise Exposed Population with a 10-Knot Northwest/Southeast Wind Restriction – 29M Low Fleet Scenario

			10-Knot Restriction		Change Relative to No Action		
DNL	No Action	Pref. Alt.	NW	NW/SE	Pref. Alt.	NW	NW/SE
75 dB and above	122	2	45	45	(120)	(77)	(77)
70 dB and above	1,612	1,381	1,322	1,322	(231)	(290)	(290)
65 dB and above	18,960	18,562	17,168	16,935	(398)	(1,792)	(2,025)
60 dB and above	68,171	71,080	68,669	67,108	2,909	498	(1,063)

- For the long-term 37.5M High RJ scenario, a northwest/southeast wind restriction on Runway 14/32 would result in noise exposed populations that are completely bounded by the No Action and the unrestricted Preferred Alternative (see Table ES-7 and Figure ES-16). Total population within the 75, 70 and 65 dB DNL contours would decline, but the reductions in the 75 and 70 dB DNL contours would not be as great as the unrestricted case. For the 60 dB DNL contour, total population would increase with the northwest/southeast restriction, but only half as much as the increase that would result with the unrestricted Runway.

Table ES-7
Total Noise Exposed Population with a 10-Knot Northwest/Southeast Wind Restriction – 37.5M High RJ Fleet Scenario

			10-Knot	Change vs. No Action	
DNL	No Action	Pref. Alt.	NW/SE Restriction	Pref. Alt.	NW/SE Restriction
75 dB and above	147	65	67	(82)	(80)
70 dB and above	3,741	2,222	3,380	(1,519)	(361)
65 dB and above	12,478	13,066	12,302	(588)	(176)
60 dB and above	40,701	54,925	47,889	14,224	7,188

ES.9.8.4 Ground Noise

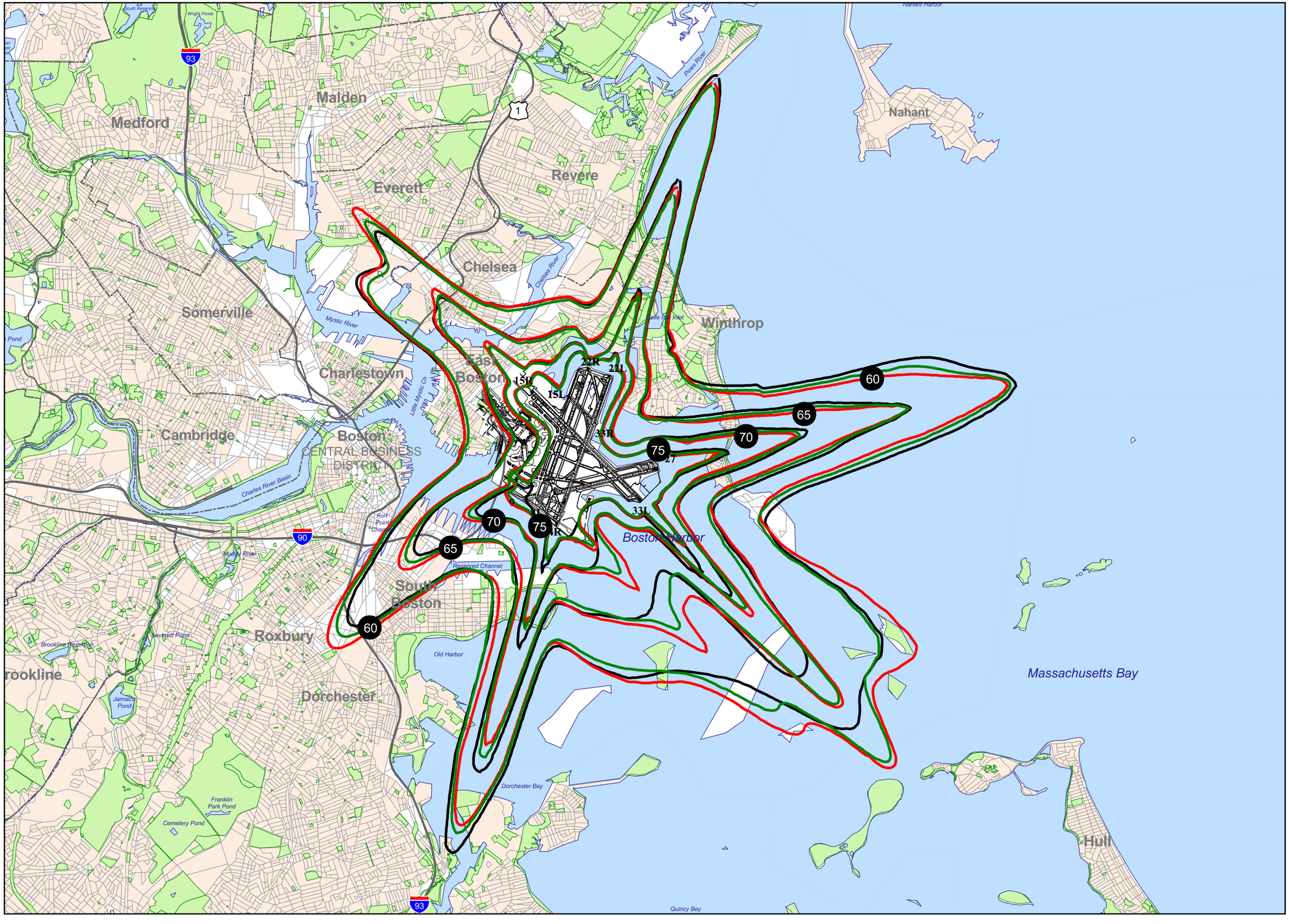
- Since the north/south runway use associated with the 10-knot northwest/southeast wind restriction is bounded by the north/south runway use associated with the No Action and unrestricted Preferred Alternatives (see Table ES-5), the ground noise impacts associated with the 10-knot northwest/southeast wind restriction are bounded as well.

ES.9.8.5 Air Quality

- The air quality impacts of the 10-knot NW/SE wind restriction are bounded by the impacts of the No Action and unrestricted Preferred Alternatives and would not result in any violations of the NAAQS.

ES.9.8.6 Historical Resources

- As with the unrestricted Preferred Alternative, the few historic residential properties within the 65 dB DNL contour associated with the 10-knot northwest/southeast wind restriction will be provided with sound insulation in accordance with historic building rehabilitation standards established by the Secretary of the Interior (36 CFR 800.5(b)).



Legend

No Action Alternative

60, 65, 70 and 75 DNL

Unrestricted
Preferred Alternative (ALT1-A)

60, 65, 70 and 75 DNL

Preferred Alternative with a
10-Knot Northwest / Southeast
Wind Restriction

60, 65, 70 and 75 DNL

Open Space

Census Blocks

Populated

Non-Populated

N

0 0.4 0.8 1.2 Miles

Figure ES-15

**Day/Night Sound Levels
29M Low Fleet DNL Contours
No Action vs. Unrestricted Preferred Alternative
vs. Preferred Alternative with a 10-Knot
Northwest/Southeast Wind Restriction
60, 65, 70 and 75 dB DNL**

Source: Harris Miller Miller & Hanson

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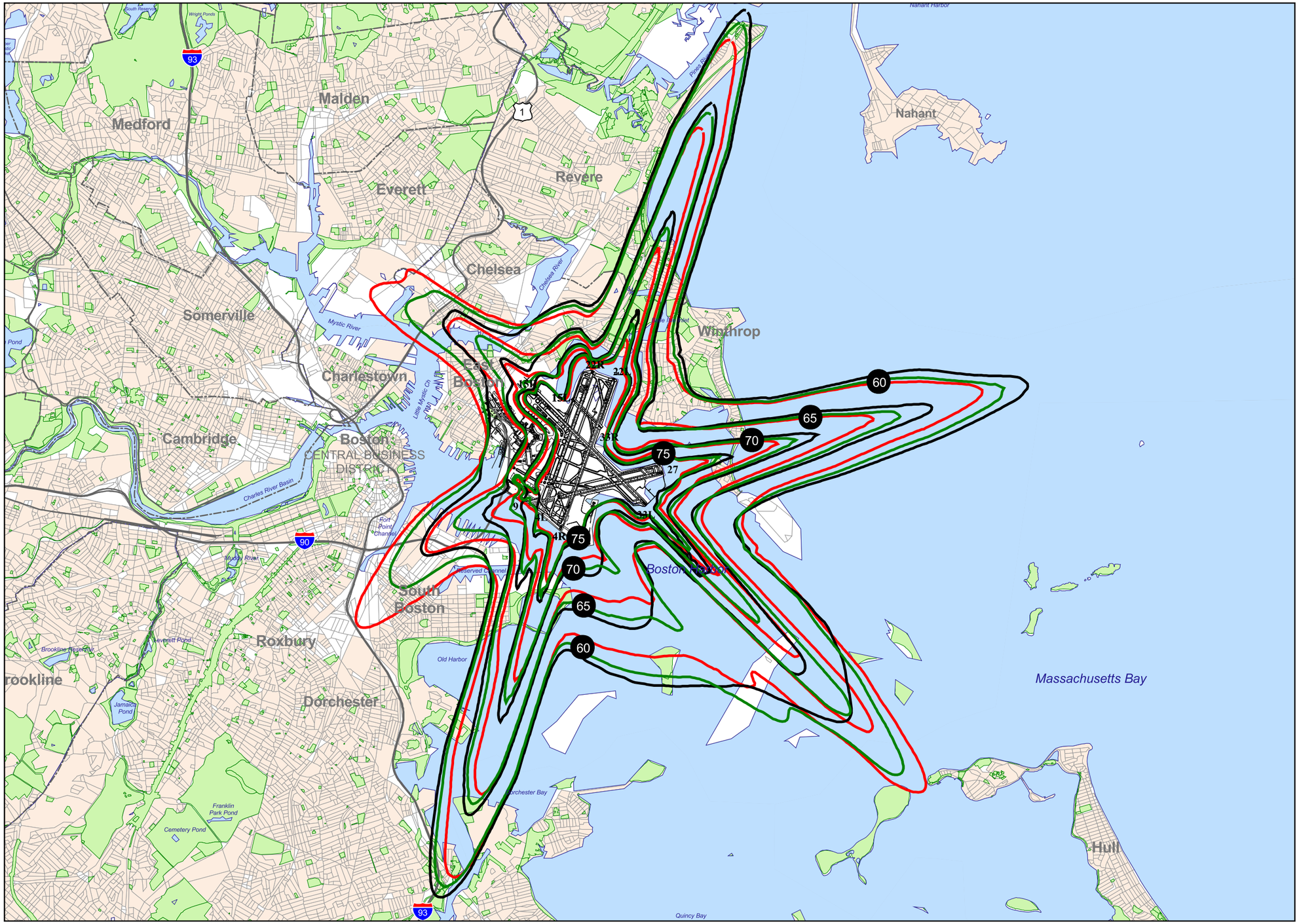

Legend

No Action Alternative
60, 65, 70 and 75 DNL

Unrestricted
Preferred Alternative (ALT1-A)
60, 65, 70 and 75 DNL

Preferred Alternative
with a 10-Knot Restriction
60, 65, 70 and 75 DNL

Open Space

Census Blocks
Populated
Non-Populated

N

0 0.4 0.8 1.2 Miles

massport

Figure ES-16

Day/Night Sound Levels
2015 37.5M High RJ Fleet DNL Contours
No Action vs. Unrestricted Preferred Alternative
vs. Preferred Alternative with a 10-Knot
Northwest / Southeast Restriction
60, 65, 70 and 75 dB DNL

Source: Harris Miller Miller & Hanson

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ES.9.8.7 Other Section 4(f) Resources

- The implementation of the Preferred Alternative with a 10-knot northwest/southeast wind restriction will neither incorporate land from a Section 4(f) resource nor affect the normal activity or aesthetic value of a public park, recreation area or wildlife refuge. The 10-knot northwest/southeast wind restriction does not add any new parklands within the 65 dB DNL contour when compared to the No Action Alternative.
- The development of the South Boston waterfront area would be considered compatible land use under 14 CFR Part 150 Land Use Compatibility Guidelines because that area of South Boston is currently (see Logan Airport 2000 EDR) and would continue to be at or less than 69 dB DNL under both the No Action and Preferred Alternative for the scenarios analyzed in this Final EIS. Indeed, under the long-term 37.5M High RJ fleet, the Preferred Alternative with a 10-knot NW/SE restriction on Runway 14/32 would remove all but a small portion of the South Boston waterfront area from the 65 dB DNL contour (compared to the unrestricted Preferred Alternative).

ES.9.8.8 Environmental Justice

- As with the unrestricted Preferred Alternative, there is no disproportionately high and significant adverse impact on minority and low-income populations caused by the Preferred Alternative with a 10-knot northwest/southeast wind restriction.

ES.9.8.9 Other Environmental Impacts

- Since a northwest/southeast wind restriction involves no on-airport construction, it will have no impact on biotic communities, water resources, or soil/sediment resources.

The analysis in this Final EIS demonstrates that with a 10-knot northwest/southeast operating restriction on Runway 14/32, the Preferred Alternative would provide substantial delay reduction benefits, but would not cause the changes in runway utilization that could result with an unrestricted runway, nor would it materially change runway utilization when compared to recent runway end use. The 10-knot northwest/southeast restriction would achieve the purpose and need of the project to reduce delays during northwest wind conditions, and would do so without significantly redistributing aircraft operations and noise impacts over the communities to the west and northwest of the airport. For these reasons and given that PRAS is being reevaluated, in this Final EIS FAA proposes a 10-knot northwest/southeast wind restriction as a mitigation measure for the Preferred Alternative to prevent major shifts in runway utilization that would occur with the current PRAS and an unrestricted runway. Any reccommendation concerning a wind restriction that might result from the updated PRAS would be subject to appropriate environmental review.

ES.9.9 Safety Benefits of the Taxiway Improvements and Reduced Minimums

Public comments on the Supplemental DEIS/FEIR raised questions as to whether the Centerfield Taxiway and other taxiway improvements would increase the potential for runway incursions[17] at Logan. In addition, other comments questioned the safety benefits of the proposed reductions in approach minimums. Safety is of paramount importance to both FAA and Massport. In April 2002, FAA reviewed the taxiway improvements and the reduced minimums to examine any safety-related issues. Representatives of the FAA, including the Flight Standards Division and Runway Safety Office, performed this review along with Massport personnel and concluded that no decrease in safety would occur compared to the current operation and confirmed that the proposed taxiway improvements and reduced minimums enhance safety in addition to reducing delays.

ES.9.9.1 Taxiway Improvements

FAA has made reducing runway incursions one of its top priorities and is engaged in ongoing efforts to reduce incursions by collecting and sharing data on such incidents; encouraging improvements in taxiway configurations; and providing additional education and training for pilots, air traffic controllers, and airport vehicle drivers. During the twelve months ending June 2001, Logan was ranked 25th in the nation with 1.17 runway incursions per 100,000 operations, a lower incursion rate than airports such as Los Angeles, New York LaGuardia, Washington Reagan, and St. Louis. All the taxiway improvements included in the Preferred Alternative were originally recommended by the *Runway Incursion Mitigation Plan*[18] prepared in 1993 by a specially created Technical Advisory Committee that consisted of representatives from the FAA Air Traffic Control Tower, the FAA New England Regional Office, the Air Transport Association, the Airline Pilots Association, Massport, and airlines serving Logan.

The Centerfield Taxiway, as currently designed, will both enhance airfield safety and increase the efficiency of aircraft taxiing operations. Specifically, the Centerfield Taxiway will provide multiple paths for routing aircraft to and from the ends of Runways 4L/22R and 4R/22L and will reduce the number and frequency of crossings of Runway 4L/22R. The Centerfield Taxiway will also increase the reliability of Logan operations by eliminating the need to use Runway 4L/22R as a taxiway whenever Taxiway November is unavailable due to construction, snow removal, or equipment problems. Finally, the Centerfield Taxiway will allow Logan to avoid taxiway conflicts from aircraft with wider wingspans and will facilitate future innovations in optimizing aircraft flows.
There are three other proposed taxiway improvements in addition to the Centerfield Taxiway: (1) Taxiway November Realignment; (2) Taxiway Delta Extension; and (3) Southwest Corner Taxiway Optimization. These other taxiway improvements are

17 In the context of taxiing aircraft, a runway incursion typically occurs when safe separation standards are violated by a taxiing aircraft that moves onto or across an active runway at a time when an arriving or departing aircraft is intending to use that runway.

18 *Runway Incursion Mitigation Plan Taxiway Relocation Study (Draft Volumes I and II)*, prepared by Edwards and Kelcey for the Massachusetts Port Authority, December 1993.

primarily safety enhancements rather than delay reduction initiatives and are designed to improve taxiway flows and reduce the potential for pilot confusion.

ES.9.9.2 Reduced Minimums

The proposed reduction in ceiling and visibility landing minimums on Runways 15R, 22L, 27 and 33L will allow air traffic controllers to assign runways which are more closely aligned with the wind during instrument conditions. Landing into a headwind is preferable since it reduces the touchdown speed of the aircraft. Landing with a crosswind—especially with gusts—is a more difficult task. The reduced minimums will enhance safety by allowing landings following an instrument approach to be made into the prevailing wind and with minimum crosswinds. Reduced minimums also enhance safety by providing positive instrument guidance at low altitudes and by reducing the probability of missed approaches. The proposed reduced minimums at Logan Airport would be consistent with recommended practices as established in FAA Order 8260.3B, United States Standards for Terminal Instrument Procedures.

ES.9.10 Impacts of the Centerfield Taxiway

As a result of public concerns about the Centerfield Taxiway, FAA is proposing to perform an additional study to evaluate potential beneficial operational procedures that would preserve or improve the operational and environmental benefits of the Centerfield Taxiway shown in the EIS. This study would be coordinated with affected parties and would address taxiing operations in the northern portion of the airfield, both on the existing Taxiway November and on the proposed Centerfield Taxiway. The FAA will defer any decision on the Centerfield Taxiway until after the study is completed.

While the Centerfield Taxiway was not examined as a separate improvement concept, the impacts of the taxiway improvements as a group can be isolated through a comparison of Alternative 2, All Improvements Except Runway 14/32, and Alternative 3, the No Build Alternative. The impacts of the operational and environmental impacts of the taxiway improvements are summarized below.

- Overall, the taxiway improvements reduce delays by approximately 5,000 to 11,000 annual hours, which represents a small share of the total delay reduction benefits associated with the Preferred Alternative. The Centerfield Taxiway is the largest contributor to taxiway delay reduction, while the other taxiway improvements (the Taxiway Delta Extension, the Taxiway November Realignment, and the Southwest Corner Optimization) serve primarily as safety enhancements.
- The Airside Project EIS analysis shows that the Centerfield Taxiway would have little impact on ground taxi noise. The average difference in noise between Alternatives 2 and 3 for the three noise monitoring stations (NMS) closest to the Centerfield Taxiway (NMS #7 - Loring Road near Court Road, Winthrop; NMS #10 – Bayswater & Shawsheen, East Boston, and NMS #12, East Boston Yacht Club, East Boston) is 0.4 dB DNL or less. At these sites, the changes in ground noise due to the taxiway

improvements are so small that they would not be readily detectable in the day-to-day environment, particularly when total aircraft noise impacts (including in-flight noise, noise from takeoff ground roll, and landing noise from thrust reversers) are considered.[19] While the taxiway improvements result in imperceptible changes in ground noise in the neighborhoods closest to the northern portion of the airfield, the Preferred Alternative results in more noticeable ground noise reductions, because the availability of Runway 14/32 reduces reliance on the north/south runway configurations and related use of the Centerfield Taxiway.

- The dispersion modeling results presented in the Airside Project EIS show that the taxiway improvements result in either no significant differences in air pollution concentration or differences that are very small. Specifically, a comparison of Alternatives 2 and 3 for three receptors at the northern end of the airfield and four different fleet scenarios shows that NO_2 levels differ by only ± 2 percent or less. These results are comparable for other pollutants (i.e., CO, VOCs, and PM). Since the dispersion modeling results reflect the potential contributions of emissions from all airport-related sources (i.e., aircraft, ground service equipment, motor vehicles, etc.) across the entire airport, the presence or absence of the Centerfield Taxiway does not cause a significant change in the modeling results.
- Since the Centerfield Taxiway does not impact runway use, there are no impacts to historical resources, other Section 4(f) resources, or Environmental Justice associated with the taxiway improvements.

The Airside Project EIS operational and environmental analyses demonstrate that the potential deferral of the Centerfield Taxiway improvement would have no discernable effect on the environmental impacts associated with the other improvement concepts in the Preferred Alternative.

ES.9.11 Capacity and Delay Modeling Assumptions

State-of-the-art airfield simulation models were used to quantify the levels of delay at Logan under past and future operating conditions. The delay simulation results for each Alternative and a range of possible future growth scenarios were analyzed in the Draft EIS/EIR, the Supplemental DEIS/FEIR, and this Final EIS. The assumptions that went into the simulation modeling— a range of aircraft operations by aircraft type, hourly weather conditions, and the operating patterns of the runways—were all carefully reviewed by the FAA and reflect a reasonable range of assumptions and future airport operating conditions.

A complete description of the capacity and delay modeling is presented in Chapter 3 of this Final EIS and the detailed fleet and forecast assumptions are contained in Appendix D of this Final EIS.

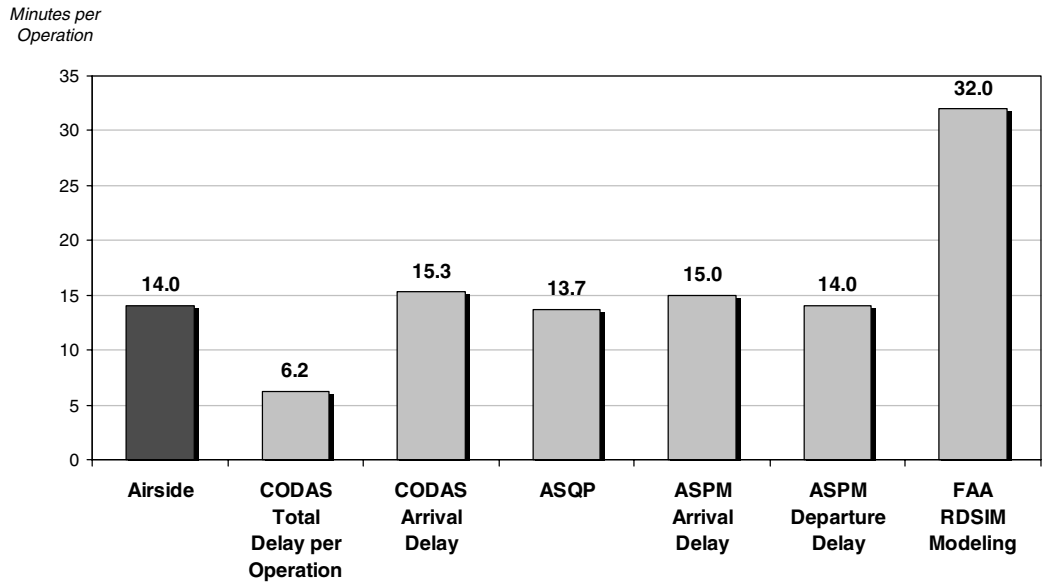
19 In general, changes in sound levels of 3 or 4 dB are barely perceptible. See "Aviation Noise Effects", Report No. FAA-EE-85-2, March 1985, page 3.

ES.9.12 Consistency of Airside Delay Estimates with Published Delay Statistics

The US DOT and FAA maintain several publicly available databases on airline flight delays. Some reviewers have compared the results of the Airside delay modeling for Logan Airport to the Total Delay per Operation statistic from the FAA Consolidated Operations and Delay Analysis System (CODAS) and have noted that the Airside delay estimates for Logan are higher than those recorded by the FAA. This section demonstrates that the Airside modeled delay estimates are consistent with all reported delay measures except the Total Delay per Operation measure in CODAS.

CODAS is no longer used by the FAA and has been replaced with the Aviation System Performance Metrics (ASPM). The ASPM data, as well as other published delay databases, show average delays at Logan that are similar to those estimated by the Airside model (see Figure ES-17).

Figure ES-17
Comparison of Various Measures of Average Delay at Logan in 1998



- The Airside modeled delays are much more conservative than the delays generated by the FAA's Technical Center. While the Airside model estimated 119,900 hours of delay for 1998, the FAA simulation showed 268,700 hours of delay for a similar demand level.
- According to the ASPM, which has replaced CODAS, arrivals at Logan were delayed by an average of 15.0 minutes per operation and departures were delayed by an average of 14.0 minutes per operation in 1998. These statistics are consistent with the DELAYSIM results, which showed average Logan delays of 14.0 minutes in 1998.

- ASQP data show 13.7 minutes of average delay per operation, compared to the 14.0 minutes estimated by the Airside model. In addition, the distribution of ASQP delays by duration is very similar to the distribution of Airside modeled delays.
- The average delay per operation generated by the Airside model is also similar to the CODAS Arrival Delay statistic (14.0 minutes vs. 15.3 minutes).

ES.10 Summary of Mitigation for the Proposed Action

This section presents a summary of measures proposed to mitigate the potential environmental and construction impacts associated with implementation of the Preferred Alternative. In addition to these Project-specific mitigation measures, other environmentally beneficial actions that FAA and Massport are undertaking to reduce the impact of Logan Airport operations on the surrounding communities are described in this section. Mitigation measures are described in detail in Chapter 4 of this Final EIS.

ES.10.1 Project-Specific Mitigation Measures

Project-specific mitigation measures are as follows:

- **Unidirectional Restriction for Runway 14/32**. The Runway 14/32 component of the Preferred Alternative has been conceived and proposed by Massport to accommodate unidirectional operations only-- i.e., all aircraft arrivals would occur over Boston Harbor to the Runway 32 approach end, and all departures would initiate from the Runway 14 end heading out over Boston Harbor. The FAA will develop and implement air traffic control procedures and measures to ensure the safe and efficient use of the navigable airspace in the general vicinity of Logan and would assign Runway 14/32 in a manner consistent with the unidirectional limitation proposed by Massport, subject to variances that may be required to accommodate particular aircraft emergencies.
- **Wind Restriction on Runway 14/32.** Given that PRAS will be reassessed, the FAA is proposing a 10-knot northwest/southeast wind restriction on the use of Runway 14/32 as a mitigation measure for the Preferred Alternative to prevent potential shifts in runway utilization that could occur with the current PRAS and an unrestricted runway. However, any recommendation concerning a wind restriction that might result from the updated PRAS would be subject to appropriate environmental review. The proposed restriction will limit the use of Runway 14/32 to periods when winds are from the northwest or southeast (between 275 to 005 degrees or between 095 to 185 degrees) at speeds of 10 knots or greater. The EIS analysis demonstrates that with such a restriction in place, Runway 14/32 provides substantial delay reduction benefits but does not materially change runway utilization when compared to CY 2000 runway end use. The 10-knot wind restriction would also reduce the total number of people within the 65 dB DNL contour,

without creating significant adverse noise impacts within individual communities when compared to the No Action Alternative. The 10-knot wind restriction achieves the purpose and need of the project by substantially reducing delays during northwest wind conditions. At the same time, a 10-knot northwest/southeast restriction prevents changes in overall runway utilization patterns at Logan and thus addresses some of the public's concerns regarding Runway 14/32.

- **Sound Insulation Program.** The construction and operation of Runway 14/32 would reduce airport noise in the residential areas most severely affected by airport noise, namely the populations located within the 70 and 75 dB DNL contours in East Boston and Winthrop. However, the change in noise distribution levels resulting from the availability of Runway 14/32 is also expected to increase the affected population within the 65 dB DNL contour in certain areas. This increase will be mitigated by providing sound insulation for those residences that fall within the 65 dB DNL contour for the 29M Low Fleet scenario.
  - **Building Code Upgrades.** FAA general sound insulation program funding requirements do not provide sound insulation benefits for buildings that do not meet applicable building codes. However, FAA is considering funding building code upgrades to the extent such upgrades are necessary for sound insulation. Funding may be provided through special Project mitigation commitments to ensure that Project-eligible residences do not lose eligibility because of building code considerations. A decision on funding eligibility will be included in the FAA's Record of Decision on the Airside Project EIS.
  - **Massport Section 61 Findings.** As described in Massport's Section 61 Findings, "If federal funding is not available to complete the sound insulation of homes newly included within the 65 dB DNL as a result of the implementation of the Airside Project, the Authority commits to providing the funding necessary to complete the sound insulation of those homes."
- **Airport Tenant Relocation Assistance** for the tenants of buildings in the South Cargo Area. The construction of Runway 14/32 would require the demolition of existing Cargo Building 60 and Cargo Building 61. To mitigate impacts, Massport will provide relocation assistance as required under applicable law.
- **Upland Sandpiper Habitat Enhancement Plan** including alteration of existing airfield grassland mowing procedures to encourage the use of non-construction areas, implementation of a pre-construction and an ongoing pre-mowing Upland Sandpiper reconnaissance program, and restoration of off-site habitat.
- **Water Resources Protection** through the use of grassed swales and infiltration of runoff, and upgrades to the existing stormdrain system.
- **Construction Mitigation** includes Massport's required Construction Mitigation Program; adherence by Massport and construction contractors to the Clean Air Construction Initiatives; and inclusion of additional measures to mitigate construction traffic, air quality, and noise impacts.

ES.10.2 Other Environmentally Beneficial Actions

Other environmentally beneficial actions that are being undertaken in association with the Preferred Alternative are as follows:

- **Noise Abatement Study.** The FAA and Massport will consult with the CAC and South Shore communities to develop a scope for a noise study that will (i) assess the potential for enhancing existing, or developing new, noise abatement procedures for Logan to achieve relief for areas impacted by Logan Airport overflights, and (ii) to identify other feasible noise relief measures.
- **Review of PRAS.** As part of its Section 61 commitments, Massport has also committed to begin working with the CAC to reassess the existing Preferential Runway Advisory System (PRAS) program. The FAA supports these efforts and will work with Massport and the CAC to assess the PRAS program, with the understanding that the current PRAS will remain in place until superseded. The noise study, described above, will provide context for the reassessment of the PRAS program.
- **Review Taxiway Operations North of Runway 15R/33L**. Although the EIS analysis shows that the Centerfield Taxiway has environmental benefits and does not adversely impact noise or reduce air quality in the areas adjacent to the northern portion of the airfield, residents of nearby communities have concerns about the Centerfield Taxiway and have questioned the FAA's compliance with the existing "good neighbor" policy regarding the queuing of aircraft on Taxiway November.[20] To address these concerns, FAA is proposing to conduct a study of taxiway operations in the northern portion of the airfield to evaluate potential beneficial operational procedures that would preserve or improve the operational and other environmental benefits of the Centerfield Taxiway. This study would be coordinated with representatives from the communities adjacent to the northern end of the airfield. The FAA would not make any decision concerning the Centerfield Taxiway until after the study and appropriate environmental review were completed.
- **PRAS Monitoring and Reporting.** Massport will develop and implement a PRAS Monitoring System and will implement a new distribution system for reports. The reports will be expanded to include information on the use of Runway 14/32 in comparison to the wind and other operational criteria that define the wind restriction. The reports monitoring compliance with the wind restriction will be distributed in the same manner as other PRAS reports. FAA will review these reports to monitor compliance with the wind restriction on Runway 14/32.
- **Demand Management Program**. Massport plans to put in place an enforceable Peak Period Pricing program or an alternative demand management program with comparable effectiveness.
- **Seek to Reduce Use of Hushkitted Aircraft at Logan.** Massport will continue to work with air carriers to encourage the use of non-hushkitted Stage 3 aircraft.

20 FAA Order BOS TWR 7040.1, "Noise Abatement".

- **Regional Transportation Steps**. FAA and Massport actively support a regional transportation policy to improve the efficient use of the region's transportation infrastructure by expanding use of the regional airports and other transportation modes, where appropriate. To achieve these goals, Massport has committed in its Section 61 Findings to continue its cooperative transportation planning efforts and is actively working with a broad array of transportation agencies and concerned parties to ensure an integrated, multi-modal regional transportation network.
- **New England Regional Aviation System Study.** The FAA, Massport, the New England State Aviation Directors, and the regional airports will cooperatively conduct the *New England Regional Aviation System Study*. This study will evaluate the potential for domestic, international, charter, and cargo services at the regional airports; evaluate capacity issues and other constraints at New England airports; and consider the development of high occupancy vehicle/ground transportation and rail services to improve access to the regional airports.
- **Single Engine Taxi Procedures.** Massport plans to develop and implement a program to maximize the use of single engine taxi procedures by all its tenant airlines, consistent with safety requirements, pilot judgment, and the requirements of federal law.
- **Transportation Management Association.** Massport will use reasonable efforts to make membership in the Logan Airport TMA mandatory for all major employers who are tenants at Logan. In addition, Massport will seek information from such employers on an annual basis regarding level of participation, actions on behalf of its employees, specifically including Massachusetts Bay Transportation Authority (MBTA) pass subsidies or other financial support, and best estimates of the High-Occupancy Vehicle (HOV) mode share for employees.